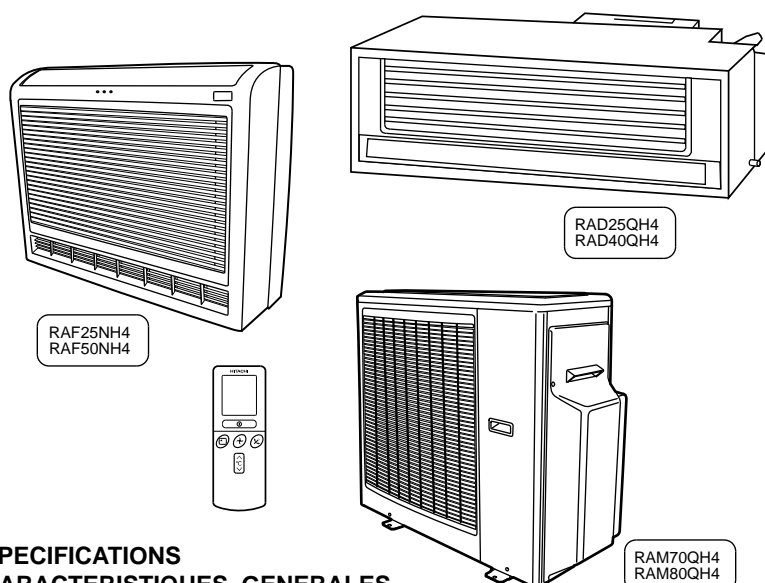


# HITACHI

## SERVICE MANUAL

TECHNICAL INFORMATION  
INFORMATIONS TECHNIQUES

FOR SERVICE PERSONNEL ONLY  
RESERVE AU PERSONNEL



### SPECIFICATIONS CARACTERISTIQUES GENERALES

TYPE		TYPE		DC INVERTER TRIPLE AND QUADRUPLE SYSTEM MULTI SYSTEME DE TRIPLE ET QUADRUPLE ONDULEUR CC MULTI							
				INDOOR UNIT		UNITÉ INTÉRIEURE		OUTDOOR UNIT		UNITÉ EXTÉRIEURE	
MODEL		MODÈLE		RAF25NH4	RAF50NH4	RAD25QH4	RAD40QH4	RAM70QH4		RAM80QH4	
POWER SOURCE		PHASE/TENSION/FREQUENCE		1Ø, 230V, 50Hz							
COOLING RÉFRIGÉRATION	TOTAL INPUT	PUISSANCE ABSORBÉE TOTALE (W)		REFER TO THE SPECIFICATIONS PAGE 10. REPORTEZ-VOUS AUX SPECIFICATIONS DE LA PAGE 11.							
	TOTAL AMPERES	AMPERES TOTAUX (A)									
	CAPACITY	CAPACITE	(kW)								
			(B.T.U./h)								
HEATING CHAUFFAGE	TOTAL INPUT	PUISSANCE ABSORBÉE TOTALE (W)									
	TOTAL AMPERES	AMPERES TOTAUX (A)									
	CAPACITY	CAPACITE	(kW)								
			(B.T.U./h)								
DIMENSIONS		DIMENSIONS (mm)		W, L	750		750		850 (+90)*		
				H, H	600		235		830		
				D, P	215		400		340 (+50)*		
NET WEIGHT		POIDS NET (kg)		15.0		14.0		77		79	

\*After installation    Après installation

SPECIFICATIONS AND PARTS ARE SUBJECT TO CHANGE FOR IMPROVEMENT  
LES SPECIFICATIONS ET PIÈCES DÉTACHÉES PEUVENT CHANGER POUR ÊTRE AMÉLIORÉES.

## ROOM AIR CONDITIONER

INDOOR UNIT + OUTDOOR UNIT

APRIL 2003

Hitachi Home & Life Solutions, Inc.

# SM0757

RAF25NH4  
RAF50NH4  
RAD25QH4  
RAD40QH4

RAM70QH4  
(MULTIZONE 70H)  
RAM80QH4  
(MULTIZONE 80H)

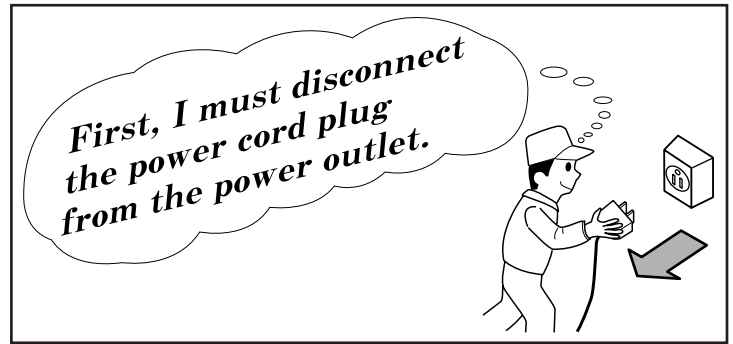
REFER TO THE FOUNDATION MANUAL  
REPORTEZ-VOUS AU MANUEL DE BASE

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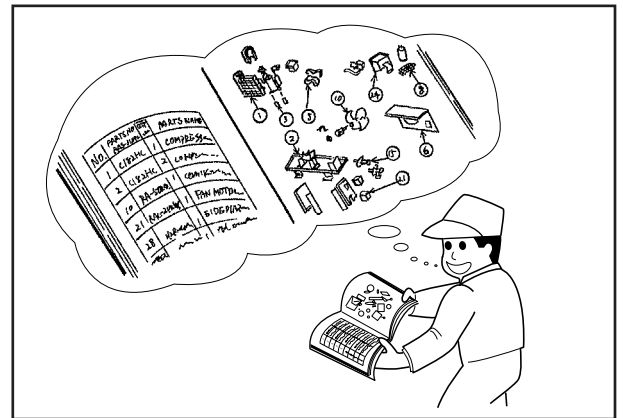
## SAFETY DURING REPAIR WORK

1. In order to disassemble and repair the unit in question, be sure to disconnect the power cord plug from the power outlet before starting the work.



2. If it is necessary to replace any parts, they should be replaced with respective genuine parts for the unit, and the replacement must be effected in correct manner according to the instructions in the Service Manual of the unit.

If the contacts of electrical parts are defective, replace the electrical parts without trying to repair them



3. After completion of repairs, the initial state should be restored.
4. Lead wires should be connected and laid as in the initial state.
5. Modification of the unit by the user himself should absolutely be prohibited.
6. Tools and measuring instruments for use in repairs or inspection should be accurately calibrated in advance.
7. In installing the unit having been repaired, be careful to prevent the occurrence of any accident such as electrical shock, leak of current, or bodily injury due to the drop of any part.
8. To check the insulation of the unit, measure the insulation resistance between the power cord plug and grounding terminal of the unit.  
The insulation resistance should be  $1M\Omega$  or more as measured by a 500V DC megger.
9. The initial location of installation such as window, floor or the other should be checked for being safe enough to support the repaired unit again.  
If it is found not so strong and safe, the unit should be installed at the initial location after reinforced or at a new location.
10. Any inflammable object must not be placed about the location of installation.
11. Check the grounding to see whether it is proper or not, and if it is found improper, connect the grounding terminal to the earth.



# WORKING STANDARDS FOR PREVENTING BREAKAGE OF SEMICONDUCTORS

## 1. Scope

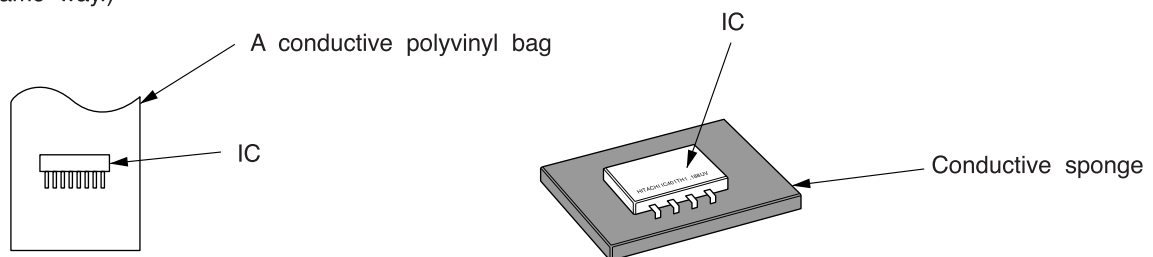
The standards provide for items to be generally observed in carrying and handling semiconductors in relative manufactures during maintenance and handling thereof. (They apply the same to handling of abnormal goods such as rejected goods being returned.)

## 2. Object parts

- (1) Micro computer
- (2) Integrated circuits (I.C.)
- (3) Field effective transistor (F.E.T.)
- (4) P.C. boards or the like to which the parts mentioned in (1) and (2) of this paragraph are equipped.

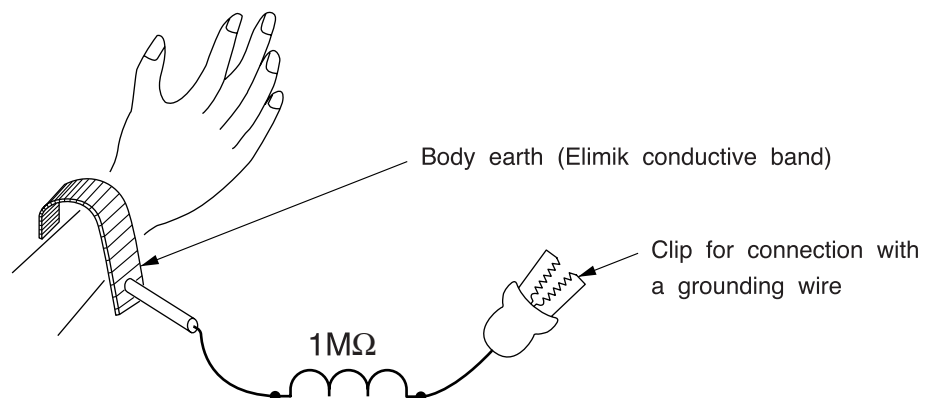
## 3. Items to be observed in handling

- (1) Use a conductive container for carrying and storing of parts. (Even rejected goods should be handled in the same way.)



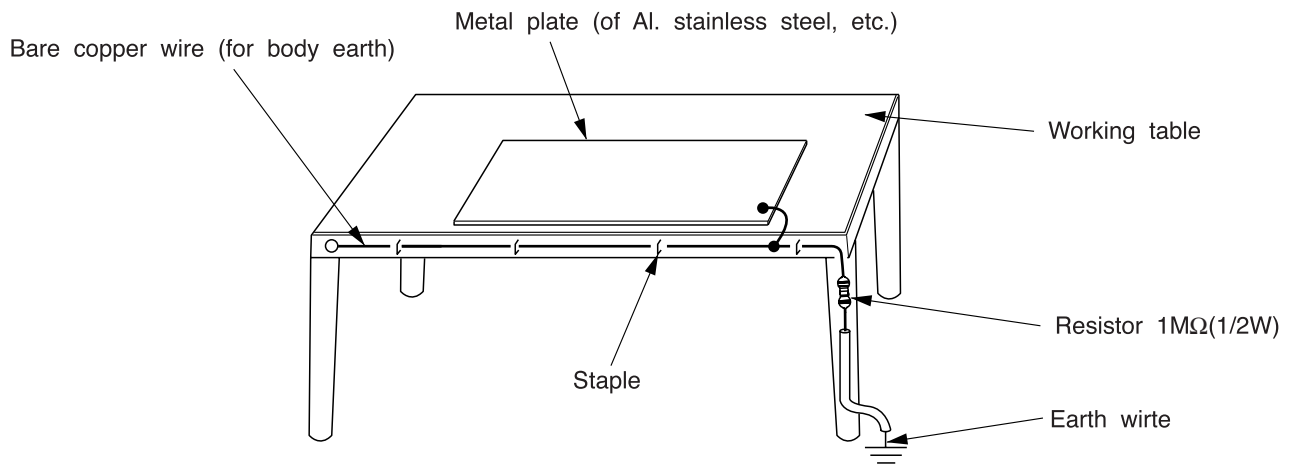
**Fig. 1 Conductive container**

- (2) When any part is handled uncovered (in counting, packing and the like), the handling person must always use himself as a body earth. (Make yourself a body earth by passing one M ohm earth resistance through a ring or bracelet.)
- (3) Be careful not to touch the parts with your clothing when you hold a part even if a body earth is being taken.
- (4) Be sure to place a part on a metal plate with grounding.
- (5) Be careful not to fail to turn off power when you repair the printed circuit board. At the same time, try to repair the printed circuit board on a grounded metal plate.

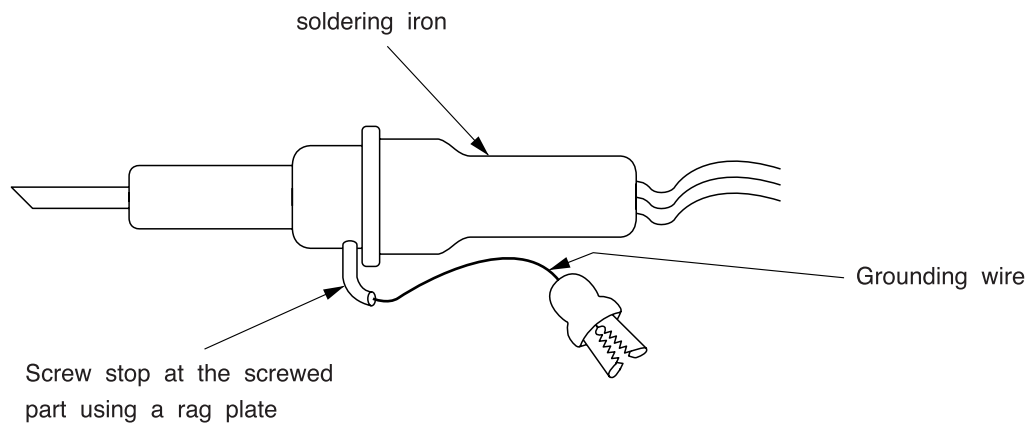


**Fig. 2 Body earth**

(6) Use a three wire type soldering iron including a grounding wire.



**Fig.3 Grounding of the working table**



**Fig.4 Grounding a solder iron**

Use a high insulation mode (100V, 10MΩ or higher) when ordinary iron is to be used.

(7) In checking circuits for maintenance, inspection, or some others, be careful not to have the test probes of the measuring instrument shortcircuit a load circuit or the like.



## **⚠ CAUTION**

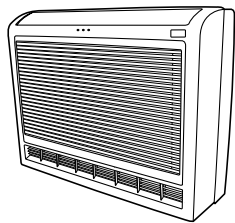
1. In quiet operation or stopping the running, its heard slight flowing noise of refrigerant in the refrigerating cycle occasionally, but this noise is not abnormal for the operation.
2. When it thunders near by, it is recommend to stop the operation and to disconnect the power cord plug from the power outlet for safety.
3. The room air conditioner dose not start automaticly after recovery of the electric power failure for preventing fuse blowing. Re-press START / STOP button after 3 minutes from when unit stopped.
4. If the room air conditioner is stopped by adjusting thermostat, or missoperation, and re-start in a moment, there is occasion that the cooling and heating operation does not start for 3 minutes, it is not abnormal and this is the result of the operation of IC delay circuit. This IC delay circuit ensures that there is no danger of blowing fuse or damaging parts even if operation is restarted accidentally.
5. This room air conditioner should not be used at the cooling operation when the outside temperature is below 10°C (50°F).
6. This room air conditioner (the reverse cycle) should not be used when the outside temperature is below -15°C (5°F).  
If the reverse cycle is used under this condition, the outside heat exchanger is frosted and efficiency falls.
7. When the outside heat exchanger is frosted, the front is melted by operating the hot gas system, it is not trouble that at this time fan stops and the vapour may rise from the outside heat exchanger.

## SPECIFICATIONS

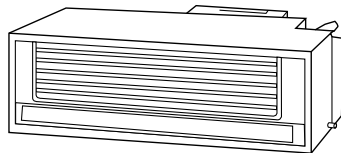
MODEL		RAF-25NH4	RAF-50NH4	RAD-25QH4	RAD-40QH4	RAM-70QH4	RAM-80QH4
FAN MOTOR		20W (DC35V)				50W	
FAN MOTOR CAPACITOR		NO					
FAN MOTOR PROTECTOR		NO					
COMPRESSOR		NO				EU1013DDX2	
OVER HEAT PROTECTOR		NO				YES	
OVERLOAD RELAY		NO				YES	
FUSE (for MICRO COMPUTER)		NO				3.15A	
POWER RELAY, STICK RELAY		NO				G4A	
POWER SWITCH		NO					
TEMPORARY SWITCH		YES				NO	
SERVICE SWITCH		NO				YES	
TRANSFORMER		NO				YES	
VARISTOR		NO				450NR	
NOISE SUPPRESSOR		NO				20132A	
THERMOSTAT		YES (IC)				NO	
REMOTE CONTROL SWITCH (LIQUID CRYSTAL)		YES (RAR-2P2)				NO	
FUSE CAPACITY		30A TIME DELAY FUSE					
REFRIGERANT CHARGING VOLUME (R410A)	UNIT	—				※A: 1450g B: 1450g	
	PIPES	WITHOUT REFRIGERANT BECAUSE COUPLING IS FLARE TYPE.					

※A: COMPRESSOR A  
B: COMPRESSOR B

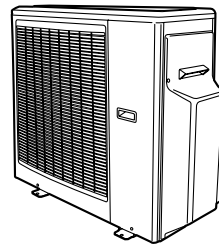
SPECIFICATION OF ROOM AIR CONDITIONER



RAF-25NH4 RAF-50NH4



RAD-25QH4 RAD-40QH4



RAM-70QH4 RAM-80QH4

				STANDARD		CE(EMC&LVD)				
TYPE		COOLING/HEATING								
		CONSOLE		FREE DUCT						
MODEL	INDOOR UNIT		RAF-25NH4		RAF-50NH4		RAD-25QH4		RAD-40QH4	
	OUTDOOR UNIT		RAM-70QH4				RAM-80QH4			
CLASS			1.0HP		2.0HP		1.0HP		1.5HP	
PHESE/VOLTAGE/FREQUENCY			1 ϕ 230V 50Hz							
COOLING  (ONE UNIT)	CAPACITY(kW) (BTU/h)		2.5(1.0~2.8) 8525(3410~9550)		5.0(1.0~5.6) 17050(3410~19100)		2.5(1.0~2.8) 8525(3410~9550)		4.0(1.0~4.5) 13640(3410~15345)	
	TOTAL INPUT(W)		780(360~980)		1910(360~2100)		780(360~980)		1340(360~1480)	
	COP		3.21		2.62		3.21		2.99	
	TOTAL AMPERES(A)		3.4		8.4		3.4		5.9	
	POWER FACTOR(%)		99		99		99		99	
	SOUND LEVEL(INDOOR)		35		44		40		43	
	AIR FLOW VOLUME(Hi)		7.4 m <sup>3</sup> /min		10.3 m <sup>3</sup> /min		8.7 m <sup>3</sup> /min		9.0 m <sup>3</sup> /min	
	COOLING (3 & 4 UNITS) RAF-25NH4×3 …RAM-70QH4	CAPACITY(kW) (BTU/h)		7.0(3.0~7.9) 23870(10230~26260)				8.0(3.0~9.2) 27280(10230~30690)		
TOTAL INPUT(W)		2180(650~3180)				2650(650~3200)				
COP		3.21				3.02				
TOTAL AMPERES(A)		9.6				11.6				
RAF-25NH4×4 …RAM-80QH4	POWER FACTOR(%)		99				99			
	SOUND LEVEL(OUTDOOR)		48				49			
HEATING  (ONE UNIT)	CAPACITY(kW) (BTU/h)		3.9(1.1~4.7) 13300(3750~14660)		6.7(1.1~7.6) 22847(3750~25920)		3.9(1.1~4.7) 13300(3750~14660)		6.0(1.1~6.8) 20460(3750~23190)	
	TOTAL INPUT(W)		1100(320~1280)		2070(320~2170)		1100(320~1280)		1770(320~1920)	
	COP		3.55		3.24		3.55		3.39	
	TOTAL AMPERES(A)		4.8		9.1		4.8		7.8	
	POWER FACTOR(%)		99		99		99		99	
	SOUND LEVEL(INDOOR)		35		44		41		43	
	AIR FLOW VOLUME(Hi)		8.5 m <sup>3</sup> /min		12.3 m <sup>3</sup> /min		9.0 m <sup>3</sup> /min		9.5 m <sup>3</sup> /min	
	HEATING (3 & 4 UNITS) RAF-25NH4×3 …RAM-70QH4	CAPACITY(kW) (BTU/h)		9.6(3.0~10.6) 32760(10230~36170)				11.0(3.0~12.4) 37530(10230~42310)		
TOTAL INPUT(W)		2480(620~3520)				2630(620~3630)				
COP		3.87				4.18				
TOTAL AMPERES(A)		10.9				11.6				
RAF-25NH4×4 …RAM-80QH4	POWER FACTOR(%)		99				99			
	SOUND LEVEL(OUTDOOR)		51				51			
AUTOMATIC AIR DEFLECTORS			YES		YES		YES		YES	
FAN SPEED			3		3		3		3	
LINE CORD			NOT PROVIDED(POWER CORD SHOULD BE PREPARED AND CONNECTED TO OUTDOOR UNIT WHEN INSTALLED)							
REMOTE CONTROL SWITCH			YES(WIRELESS)		YES(WIRELESS)		YES(WIRELESS)		YES(WIRE LESS)	
MAXIMUM LENGTH OF PIPING			MAX60m(THREE UNITS TOTAL)				MAX70m(FOUR UNITS TOTAL)			
MODEL			RAF-25NH4,50NH4		RAD-25QH4,40QH4		RAM-70QH4		RAM-80QH4	
DIMENSIONS inches(mm)	W		29-17/32(750)		29-17/32(750)		33-1/2(850)			
	H		35-5/8(600)		9-1/4(235)		32-11/16(830)			
	D		8-15/32(215)		15-3/4(400)		15-17(390)			
	(INSTALLED)		-		-		-			
NET WEIGHT (kg)			15		14		77		79	
PACKING inches(mm)	W		31-3/8(797)		31-23/32(806)		39-1/4(997)			
	H		25-13/16(656)		23-3/8(594)		34-21/32(880)			
	D		10-15/16(278)		12-1/16(306)		16-15/16(430)			
	cu.ft		5.13		5.17		13.31			
GROSS WEIGHT(kg)			17		16		81		83	
FLARE NUT SIZE(SMALL/LARGE)			6.35/9.52 6.35/12.7		6.35/9.52		6.35/9.52			



**TRIPLE SYSTEM MULTI R.A.C. *MULTIZONE 70H***  
**COOL / HEAT CAPACITY SPEC. FOR INDOOR UNITS**  
**COMBINATIONS**  
**TO BE ABLE TO OPERATE SIMULTANEOUSLY**

Whichever indoor units are installed, cooling and heating capacity depends on how many and which indoor units are operating at that time.

MODEL : R A M—7 0 Q H 4

POSSIBLE COMBINATIONS TO OPERATE		COOLING			HEATING		
		CAPACITY RATING (kW) (RANGE)	POWER CONSUMPTION (W)	AMPERE(A) 230V	CAPACITY RATING (kW) (RANGE)	POWER CONSUMPTION (W)	AMPERE(A) 230V
ONE UNIT	2.5	2.50	780	3.4	3.90	1100	4.8
		(1.00~2.80)	(360~980)		(1.10~4.70)	(320~1,280)	
	3.5	3.50	1160	5.1	4.80	1380	6.1
		(1.00~3.90)	(360~1,280)		(1.10~5.80)	(320~1,750)	
	4.0	4.00	1340	5.9	6.00	1770	7.8
		(1.00~4.50)	(360~1,480)		(1.10~6.80)	(320~1,920)	
	5.0	5.00	1910	8.4	6.70	2070	9.1
		(1.00~5.60)	(360~2,100)		(1.10~7.60)	(320~2,170)	
◇ TWO UNITS	2.5+2.5	2.50+2.50	1560	6.9	3.90+3.90	2290	10.1
		(1.50~5.60)	(640~1,720)		(1.50~8.60)	(600~2,520)	
	2.5+3.5	2.50+3.50	1990	8.7	3.90+4.80	2690	11.8
		(1.50~6.60)	(640~2,190)		(1.50~9.60)	(600~2,960)	
	2.5+4.0	2.50+4.00	2220	9.7	3.50+5.50	3200	14.1
		(1.50~7.00)	(640~2,440)		(1.50~9.90)	(600~3,520)	
	2.5+5.0	2.50+4.50	2580	11.3	3.00+6.00	3200	14.1
		(1.50~7.60)	(640~2,840)		(1.50~9.90)	(600~3,520)	
	3.5+3.5	3.50+3.50	2580	11.3	4.70+4.70	3200	14.1
		(1.50~7.60)	(640~2,840)		(1.50~10.30)	(600~3,520)	
	3.5+4.0	3.30+3.70	2580	11.3	4.50+4.90	3200	14.1
		(1.50~7.60)	(640~2,840)		(1.50~10.30)	(600~3,520)	
	3.5+5.0	2.90+4.10	2580	11.3	3.90+5.50	3200	14.1
		(1.50~7.60)	(640~2,840)		(1.50~10.30)	(600~3,520)	
	4.0+4.0	3.50+3.50	2580	11.3	4.70+4.70	3200	14.1
		(1.50~7.60)	(640~2,840)		(1.50~10.30)	(600~3,520)	
	4.0+5.0	3.10+3.90	2580	11.3	4.20+5.20	3200	14.1
		(1.50~7.60)	(640~2,840)		(1.50~10.30)	(600~3,520)	
◆ TWO UNITS	2.5+2.5	2.50+2.50	1660	7.3	2.90+2.90	1580	6.9
		(1.50~5.50)	(640~1830)		(1.50~6.40)	(600~1,740)	
	2.5+3.5	2.30+3.30	1860	8.2	2.60+3.60	1930	8.5
		(1.50~6.20)	(640~2,050)		(1.50~6.80)	(600~2,120)	
	2.5+4.0	2.20+3.40	1860	8.2	2.40+3.80	1930	8.5
		(1.50~6.20)	(640~2,050)		(1.50~6.80)	(600~2,120)	
	3.5+3.5	2.80+2.80	1860	8.2	3.10+3.10	1930	8.5
		(1.50~6.20)	(640~2,050)		(1.50~6.80)	(600~2,120)	

POSSIBLE COMBINATIONS TO OPERATE		COOLING			HEATING		
		CAPACITY RATING (kW) (RANGE)	POWER CONSUMPTION (W)	AMPERE(A) 230V	CAPACITY RATING (kW) (RANGE)	POWER CONSUMPTION (W)	AMPERE(A) 230V
THREE UNITS	2.5+2.5+2.5	2.33+2.33+2.33	2180	9.6	3.20+3.20+3.20	2480	10.9
		(3.00~7.90)	(650~3,180)		(3.00~10.60)	(620~3,520)	
	2.5+2.5+3.5	2.05+2.05+2.90	2180	9.6	2.80+2.80+4.00	2480	10.9
		(3.00~7.90)	(650~3,180)		(3.00~10.60)	(620~3,520)	
	2.5+2.5+4.0	1.95+1.95+3.10	2180	9.6	2.60+2.60+4.40	2480	10.9
		(3.00~7.90)	(650~3,180)		(3.00~10.60)	(620~3,520)	
	2.5+2.5+5.0	1.75+1.75+3.50	2180	9.6	2.35+2.35+4.90	2480	10.9
		(3.00~7.90)	(650~3,180)		(3.00~10.60)	(620~3,520)	
	2.5+3.5+3.5	1.80+2.60+2.60	2180	9.6	2.53+3.53+3.53	2480	10.9
		(3.00~7.90)	(650~3,180)		(3.00~10.60)	(620~3,520)	
	2.5+3.5+4.0	1.75+2.45+2.80	2180	9.6	2.40+3.40+3.80	2480	10.9
		(3.00~7.90)	(650~3,180)		(3.00~10.60)	(620~3,520)	

 Two units      Each unit is connected to each compressor.  
 Two units      Two unit are connected to one compressor.

#### RATING CONDITION (DRY BULB / WET BULB)

	INDOOR	OUTDOOR
COOLING	27 / 19 °C	35 / — °C
HEATING	20 / — °C	7 / 6 °C

**TRIPLE SYSTEM MULTI R.A.C *RAM-70QH4***  
**INDOOR UNITS COMBINATIONS**  
**TO BE ABLE TO INSTALL**

Two or three indoor units can be installed with one outdoor unit,  
while htree is desirable.

And total nominal cooling capacity should not be more than 11.0kW.

INDOOR UNIT MODEL	NOMINAL COOLING CAPACITY (kW)	CAPACITY ( kW ) AT ONE UNIT OPERATION		SUITABLE ROOM SIZE (m <sup>2</sup> ) AT ONE UNIT OPERATION	
		COOLING	HEATING	COOLING	HEATING
RAD-25QH4	2.5	1.00~2.80	1.10~4.70	11~17	15~18
RAF-25NH4	2.5	1.00~2.80	1.10~4.70	11~17	15~18
RAD-40QH4	4.0	1.00~4.50	1.10~6.80	18~28	22~27
RAF-50NH4	5.0	1.00~5.60	1.10~7.60	23~34	24~30

POSSIBLE COMBINATIONS TO INSTALL		SUITABLE ROOM SIZE TO INSTALL (m <sup>2</sup> )	CONNECTING POSITION ON OUTDOOR UNIT (VALVE DIAMETER) (mm)		
			NO.1	NO.2	NO.3
			6.35/9.52D	6.35/9.52D	6.35/9.52D
TWO UNITS	2.5+2.5	(12~15)+(12~15)	2.5	---	2.5
	2.5+3.5	(12~15)+(14~18)	2.5	---	3.5
	2.5+4.0	(11~14)+(16~20)	2.5	---	4.0
	2.5+5.0	(11~14)+(18~22)	2.5	---	☆ 5.0
	3.5+3.5	(14~18)+(14~18)	3.5	---	3.5
	3.5+4.0	(13~17)+(16~20)	3.5	---	4.0
	3.5+5.0	(13~16)+(18~22)	3.5	---	☆ 5.0
	4.0+4.0	(16~20)+(16~20)	---	4.0	4.0
	4.0+5.0	(16~20)+(18~22)	---	4.0	☆ 5.0
	2.5+2.5	(12~15)+(12~15)	2.5	2.5	---
	2.5+3.5	(12~15)+(14~18)	2.5	3.5	---
	2.5+4.0	(11~14)+(16~20)	2.5	4.0	---
	3.5+3.5	(14~18)+(14~18)	3.5	3.5	---

2.5,3.5,4.0,5.0 means indoor units cooling capacity class.

POSSIBLE COMBINATIONS TO INSTALL		SUITABLE ROOM SIZE TO INSTALL (m <sup>2</sup> )	CONNECTING POSITION ON OUTDOOR UNIT (VALVE DIAMETER) (mm)		
			NO.1	NO.2	NO.3
			6.35/9.52D	6.35/9.52D	6.35/9.52D
THREE UNITS	2.5+2.5+2.5	(10~13)+(10~13)+(10~13)	2.5	2.5	2.5
	2.5+2.5+3.5	(10~13)+(10~13)+(12~15)	2.5	2.5	3.5
	2.5+2.5+4.0	(9~11)+(9~11)+(16~20)	2.5	2.5	4.0
	2.5+2.5+5.0	(9~11)+(9~11)+(18~22)	2.5	2.5	☆ 5.0
	2.5+3.5+3.5	(10~13)+(13~16)+(13~16)	2.5	3.5	3.5
	2.5+3.5+4.0	(9~11)+(11~14)+(16~20)	2.5	3.5	4.0
	2.5+3.5+5.0	(9~11)+(11~14)+(18~22)	2.5	3.5	☆ 5.0
	2.5+4.0+4.0	(9~11)+(14~17)+(14~17)	2.5	4.0	4.0
	3.5+3.5+3.5	(13~16)+(13~16)+(13~16)	3.5	3.5	3.5
	3.5+3.5+4.0	(12~15)+(12~15)+(13~17)	3.5	3.5	4.0

(1) Marking ☆:needs flare adapter(9.52D→12.7D):Part No.HFD43D- 4 001

(2) Suitable room size is determined based on the conditions below:

- Climate is in the Temperate Zone like Tokyo,Japan.
- For usual residential use.
- Smaller figure is for light construction which means light thermally sealed.  
Larger figure is for heavy construction which means well thermally sealed.

**QUADRUPLE SYSTEM MULTI R.A.C. *MULTIZONE 80H***  
**COOL / HEAT CAPACITY SPEC. FOR INDOOR UNITS**  
**COMBINATIONS**  
**TO BE ABLE TO OPERATE SIMULTANEOUSLY**

Whichever indoor units are installed, cooling and heating capacity depends on how many and which indoor units are operating at that time.

MODEL : R A M—8 0 Q H 4

POSSIBLE COMBINATIONS TO OPERATE		COOLING			HEATING		
		CAPACITY RATING (kW) (RANGE)	POWER CONSUMPTION (W)	AMPERE(A) 230V	CAPACITY RATING (kW) (RANGE)	POWER CONSUMPTION (W)	AMPERE(A) 230V
ONE UNIT	2.5	2.50 (1.00~2.80)	780 (360~980)	3.4	3.90 (1.10~4.70)	1100 (320~1,280)	4.8
	3.5	3.50 (1.00~3.90)	1160 (360~1,280)	5.1	4.80 (1.10~5.80)	1380 (320~1,750)	6.1
	4.0	4.00 (1.00~4.50)	1340 (360~1,480)	5.9	6.00 (1.10~6.80)	1770 (320~1,920)	7.8
	5.0	5.00 (1.00~5.60)	1910 (360~2,100)	8.4	6.70 (1.10~7.60)	2070 (320~2,170)	9.1
	2.5+2.5	2.50+2.50 (1.50~5.60)	1560 (640~1,720)	6.9	3.90+3.90 (1.50~8.60)	2290 (600~2,520)	10.1
TWO UNITS	2.5+3.5	2.50+3.50 (1.50~6.60)	1990 (640~2,190)	8.7	3.90+4.80 (1.50~9.60)	2690 (600~2,960)	11.8
	2.5+4.0	2.50+4.00 (1.50~7.00)	2220 (640~2,440)	9.7	3.50+5.50 (1.50~9.90)	3200 (600~3,520)	14.1
	2.5+5.0	2.50+4.50 (1.50~7.60)	2580 (640~2,840)	11.3	3.00+6.00 (1.50~9.90)	3200 (600~3,520)	14.1
	3.5+3.5	3.50+3.50 (1.50~7.60)	2580 (640~2,840)	11.3	4.70+4.70 (1.50~10.30)	3200 (600~3,520)	14.1
	3.5+4.0	3.50+4.00 (1.50~8.00)	2720 (640~2,990)	11.9	4.50+4.90 (1.50~10.30)	3200 (600~3,520)	14.1
	3.5+5.0	3.10+4.40 (1.50~8.00)	2720 (640~2,990)	11.9	4.00+5.60 (1.50~10.60)	3300 (600~3,630)	14.5
	4.0+4.0	4.00+4.00 (1.50~8.20)	2760 (640~3,040)	12.1	4.80+4.80 (1.50~10.60)	3300 (600~3,630)	14.5
	4.0+5.0	3.60+4.40 (1.50~8.20)	2760 (640~3,040)	12.1	4.30+5.30 (1.50~10.60)	3300 (600~3,630)	14.5
	5.0+5.0	4.00+4.00 (1.50~8.20)	2760 (640~3,040)	12.1	4.80+4.80 (1.50~10.60)	3300 (600~3,630)	14.5
	2.5+2.5	2.50+2.50 (1.50~5.50)	1660 (640~1830)	7.3	2.90+2.90 (1.50~6.40)	1580 (600~1,740)	6.9
	2.5+3.5	2.30+3.30 (1.50~6.20)	1860 (640~2,050)	8.2	2.60+3.60 (1.50~6.80)	1930 (600~2,120)	8.5
	2.5+4.0	2.20+3.40 (1.50~6.20)	1860 (640~2,050)	8.2	2.40+3.80 (1.50~6.80)	1930 (600~2,120)	8.5
	3.5+3.5	2.80+2.80 (1.50~6.20)	1860 (640~2,050)	8.2	3.10+3.10 (1.50~6.80)	1930 (600~2,120)	8.5
TWO UNITS	2.5+2.5	2.50+2.50 (1.50~5.50)	1660 (640~1830)	7.3	2.90+2.90 (1.50~6.40)	1580 (600~1,740)	6.9
	2.5+3.5	2.30+3.30 (1.50~6.20)	1860 (640~2,050)	8.2	2.60+3.60 (1.50~6.80)	1930 (600~2,120)	8.5
	2.5+4.0	2.20+3.40 (1.50~6.20)	1860 (640~2,050)	8.2	2.40+3.80 (1.50~6.80)	1930 (600~2,120)	8.5
	3.5+3.5	2.80+2.80 (1.50~6.20)	1860 (640~2,050)	8.2	3.10+3.10 (1.50~6.80)	1930 (600~2,120)	8.5



POSSIBLE COMBINATIONS TO OPERATE		COOLING			HEATING		
		CAPACITY RATING (kW) (RANGE)	POWER CONSUMPTION (W)	AMPERE(A) 230V	CAPACITY RATING (kW) (RANGE)	POWER CONSUMPTION (W)	AMPERE(A) 230V
THREE UNITS	2.5+2.5+2.5	2.50+2.50+2.50 (3.00~8.20)	2420 (650~3,000)	10.6	3.40+3.40+3.40 (3.00~11.20)	2530 (620~3,630)	11.1
	2.5+2.5+3.5	2.30+2.30+3.40 (3.00~8.50)	2580 (650~3,200)	11.3	3.00+3.00+4.20 (3.00~11.20)	2530 (620~3,630)	11.1
	2.5+2.5+4.0	2.20+2.20+3.60 (3.00~8.50)	2580 (650~3,200)	11.3	2.80+2.80+4.60 (3.00~11.20)	2530 (620~3,630)	11.1
	2.5+2.5+5.0	2.00+2.00+4.00 (3.00~8.50)	2580 (650~3,200)	11.3	2.60+2.60+5.00 (3.00~11.20)	2530 (620~3,630)	11.1
	2.5+3.5+3.5	2.00+3.00+3.00 (3.00~8.50)	2580 (650~3,200)	11.3	2.60+3.80+3.80 (3.00~11.20)	2530 (620~3,630)	11.1
	2.5+3.5+4.0	2.00+2.90+3.10 (3.00~8.50)	2580 (650~3,200)	11.3	2.60+3.60+4.00 (3.00~11.20)	2530 (620~3,630)	11.1
	2.5+3.5+5.0	1.80+2.60+3.60 (3.00~8.50)	2580 (650~3,200)	11.3	2.30+3.30+4.60 (3.00~11.20)	2530 (620~3,630)	11.1
	2.5+4.0+4.0	2.00+3.00+3.00 (3.00~8.50)	2580 (650~3,200)	11.3	2.40+3.90+3.90 (3.00~11.20)	2530 (620~3,630)	11.1
	2.5+4.0+5.0	1.70+2.80+3.50 (3.00~8.50)	2580 (650~3,200)	11.3	2.30+3.50+4.40 (3.00~11.20)	2530 (620~3,630)	11.1
	3.5+3.5+3.5	2.66+2.66+2.66 (3.00~8.50)	2580 (650~3,200)	11.3	3.40+3.40+3.40 (3.00~11.20)	2530 (620~3,630)	11.1
	3.5+3.5+4.0	2.60+2.60+2.80 (3.00~8.50)	2580 (650~3,200)	11.3	3.20+3.20+3.80 (3.00~11.20)	2530 (620~3,630)	11.1
	3.5+3.5+5.0	2.40+2.40+3.20 (3.00~8.50)	2580 (650~3,200)	11.3	3.00+3.00+4.20 (3.00~11.20)	2530 (620~3,630)	11.1
	3.5+4.0+4.0	2.40+2.80+2.80 (3.00~8.50)	2580 (650~3,200)	11.3	3.20+3.50+3.50 (3.00~11.20)	2530 (620~3,630)	11.1
FOUR UNITS	2.5+2.5+2.5+2.5	2.00+2.00+2.00+2.00 (3.00~9.20)	2650 (650~3,200)	11.6	2.75+2.75+2.75+2.75 (3.00~12.40)	2630 (620~3,630)	11.6
	2.5+2.5+2.5+3.5	1.85+1.85+1.85+2.45 (3.00~9.20)	2650 (650~3,200)	11.6	2.50+2.50+2.50+3.50 (3.00~12.40)	2630 (620~3,630)	11.6
	2.5+2.5+2.5+4.0	1.80+1.80+1.80+2.60 (3.00~9.20)	2650 (650~3,200)	11.6	2.40+2.40+2.40+3.80 (3.00~12.40)	2630 (620~3,630)	11.6
	2.5+2.5+3.5+3.5	1.70+1.70+2.30+2.30 (3.00~9.20)	2650 (650~3,200)	11.6	2.30+2.30+3.20+3.20 (3.00~12.40)	2630 (620~3,630)	11.6



Two units  
Two units

Each unit is connected to each compressor.  
Two unit are connected to one compressor.

#### RATING CONDITION (DRY BULB / WET BULB)

	INDOOR	OUTDOOR
COOLING	27 / 19 °C	35 / — °C
HEATING	20 / — °C	7 / 6 °C

**QUADRUPLE SYSTEM MULTI R.A.C *RAM-80QH4***  
**INDOOR UNITS COMBINATIONS**  
**TO BE ABLE TO INSTALL**

Two, three or four indoor units can be installed with one outdoor unit, while three or four is desirable.

And total nominal cooling capacity should not be more than 12.0kW.

INDOOR UNIT MODEL	NOMINAL COOLING CAPACITY (kW)	CAPACITY ( kW )		SUITABLE ROOM SIZE (m <sup>2</sup> )	
		AT ONE UNIT OPERATION		AT ONE UNIT OPERATION	
		COOLING	HEATING	COOLING	HEATING
RAD-25QH4	2.5	1.00~2.80	1.10~4.70	11~17	15~18
RAF-25NH4	2.5	1.00~2.80	1.10~4.70	11~17	15~18
RAD-40QH4	4.0	1.00~4.50	1.10~6.80	18~28	22~27
RAF-50NH4	5.0	1.00~5.60	1.10~7.60	23~34	24~30

POSSIBLE COMBINATIONS TO INSTALL		SUITABLE ROOM SIZE TO INSTALL (m <sup>2</sup> )	CONNECTING POSITION ON OUTDOOR UNIT (VALVE DIAMETER) (mm)			
			NO.1	NO.2	NO.3	NO.4
			6.35/9.52D	6.35/9.52D	6.35/9.52D	6.35/9.52D
TWO UNITS	2.5+2.5	(12~15)+(12~15)	2.5	---	2.5	---
	2.5+3.5	(12~15)+(14~18)	2.5	---	3.5	---
	2.5+4.0	(11~14)+(16~20)	2.5	---	---	4.0
	2.5+5.0	(11~14)+(18~22)	2.5	---	---	☆ 5.0
	3.5+3.5	(14~18)+(14~18)	3.5	---	3.5	---
	3.5+4.0	(13~17)+(16~20)	3.5	---	---	4.0
	3.5+5.0	(13~16)+(18~22)	3.5	---	---	☆ 5.0
	4.0+4.0	(16~20)+(16~20)	---	4.0	---	4.0
	4.0+5.0	(16~20)+(18~22)	---	4.0	---	☆ 5.0
	2.5+2.5	(12~15)+(12~15)	2.5	2.5	---	---
	2.5+3.5	(12~15)+(14~18)	2.5	3.5	---	---
	2.5+4.0	(11~14)+(16~20)	2.5	4.0	---	---
	3.5+3.5	(14~18)+(14~18)	3.5	3.5	---	---

2.5,3.5,4.0,5.0 means indoor units cooling capacity class.

POSSIBLE COMBINATIONS TO INSTALL		SUITABLE ROOM SIZE TO INSTALL (m <sup>2</sup> )	CONNECTING POSITION ON OUTDOOR UNIT (VALVE DIAMETER) (mm)			
			NO.1	NO.2	NO.3	NO.4
			6.35/9.52D	6.35/9.52D	6.35/9.52D	6.35/9.52D
THREE UNITS	2.5+2.5+2.5	(10~13)+(10~13)+(10~13)	2.5	2.5	2.5	---
	2.5+2.5+3.5	(10~13)+(10~13)+(12~15)	2.5	2.5	3.5	---
	2.5+2.5+4.0	(9~11)+(9~11)+(16~20)	2.5	2.5	---	4.0
	2.5+2.5+5.0	(9~11)+(9~11)+(18~22)	2.5	2.5	---	☆ 5.0
	2.5+3.5+3.5	(10~13)+(13~16)+(13~16)	2.5	3.5	3.5	---
	2.5+3.5+4.0	(9~11)+(11~14)+(16~20)	2.5	3.5	---	4.0
	2.5+3.5+5.0	(9~11)+(11~14)+(18~22)	2.5	3.5	---	☆ 5.0
	2.5+4.0+4.0	(9~11)+(14~17)+(14~17)	2.5	4.0	---	4.0
	2.5+4.0+5.0	(9~11)+(14~17)+(18~22)				
	3.5+3.5+3.5	(13~16)+(13~16)+(13~16)	3.5	3.5	3.5	---
	3.5+3.5+4.0	(12~15)+(12~15)+(13~17)				
	3.5+3.5+5.0	(12~16)+(12~16)+(12~16)				
	3.5+3.5+4.0	(12~15)+(12~15)+(13~17)	3.5	3.5	---	4.0

POSSIBLE COMBINATIONS TO INSTALL		SUITABLE ROOM SIZE TO INSTALL (m <sup>2</sup> )	CONNECTING POSITION ON OUTDOOR UNIT (VALVE DIAMETER) (mm)			
			NO.1	NO.2	NO.3	NO.4
			6.35/9.52D	6.35/9.52D	6.35/9.52D	6.35/9.52D
FOUR UNITS	2.5+2.5 +2.5+2.5	(9~11)+(9~11) +(9~11)+(9~11)	2.5	2.5	2.5	2.5
	2.5+2.5 +2.5+3.5	(9~11)+(9~11) +(9~11)+(10~13)	2.5	2.5	2.5	3.5
	2.5+2.5 +2.5+4.0	(9~11)+(9~11) +(9~11)+(11~14)	2.5	2.5	2.5	4.0
	2.5+2.5 +3.5+3.5	(9~11)+(9~11) +(10~13)+(10~13)	2.5	2.5	3.5	3.5

(1) Marking ☆:needs flare adapter(9.52D→12.7D):Part No.HFD43D-4 001

(2) Suitable room size is determined based on the conditions below:

- Climate is in the Temperate Zone like Tokyo,Japan.
- For usual residential use.
- Smaller figure is for light construction which means light thermally sealed.  
Larger figure is for heavy construction which means well thermally sealed.

## FEATURES

### 1. NEW REFRIGERANT

#### (1) New refrigerant R410A with no harmful effect on the ozone layer

Refrigerant R410A, which does not damage the ozone layer, was adopted instead of HCFC-22 which is planned to be phased out globally by 2020.

#### (2) New refrigerating oil

The new refrigerant HFC-R410A is not compatible with conventional mineral oils and no lubrication can be expected with those oils. To solve this, the artificial synthetic ester oil is newly adopted.

## NEW TECHNOLOGY

Cautions in relation to HFC (R410A)

### 1. Safety during Servicing

This air conditioner uses the new refrigerant HFC (R410A) for protecting the ozone layer. R410A has several different characteristic features from HCFC-22. Therefore keep the following care items during servicing for safety.

(1) Since the working pressure of R410A model is about 1.6 times higher than that of HCFC-22 models, it becomes necessary to use part of piping materials and servicing tools exclusive for R410A model.

(2) It is necessary to exercise more care to prevent the foreign matters (oil, moisture, etc.) from mixing into the piping than in the case of HCFC-22 model. Also, when storing the piping, securely seal its openings with pinching and taping, etc..

(3) Be sure to charge the refrigerant from the liquid-phase side, as the liquid-phase/gas-phase-composition changes a little in the case of R410A model.

(4) Never use refrigerant other than R410A in an air conditioner which is designed to operate with R410A.

(5) If a refrigeration gas leakage occurs during servicing, be sure to ventilate fully.  
If the refrigerant gas comes into contact with fire, a poisonous gas may occur.

(6) When installing or removing an air conditioner, do not allow air or moisture to remain in the refrigeration cycle. Otherwise, pressure in the refrigeration cycle may become abnormally high so that a rupture or personal injury may be caused.

(7) After completion of service work, check to make sure that there is no refrigeration gas leakage.  
If the refrigerant gas leaks into the room, coming into contact with fire in the fan-driven heater, space heater, etc., a poisonous gas may occur.

## 2. Refrigerant Piping Materials

### (1) Thickness of Refrigerant Piping

Although the thickness is same as that for HCFC-22 model, as R410A model features higher pressure, be sure to confirm the thickness prior to use.

※Do not use thin pipes (thinner than 0.7 mm).

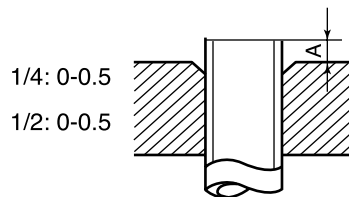
Nominal diameter	Outside diameter (mm)	Thickness (mm)
1/4	6.35	0.8
1/2	12.70	0.8

### (2) Flare's Expansion Pipe

The projection when the new flare tool is used, is as follows. When using the conventional flare tool, be sure to secure the following projection by using a gauge for projection adjustment.

※When using the conventional flare tool, use a gauge for projection adjustment.

Projection "A"(mm) for Flare Tool for R410A (Clutch Type)



### (3) Flare Nut Dimensions

Along with changes in the expansion pipe dimensions, the opposite side dimensions of flare nuts whose nominal diameter is 1/2 change so that different torque wrenches must be used.

※Figures in ( ) denote those for HCFC-22.

Nominal diameter	Opposite Side Dimensions (mm) of Flare Nuts for R410A
1/4	17 (17)
3/8	22 (22)
1/2	26 (24)

### 3. Servicing Tools

#### 〈Changes in the Product and Components〉

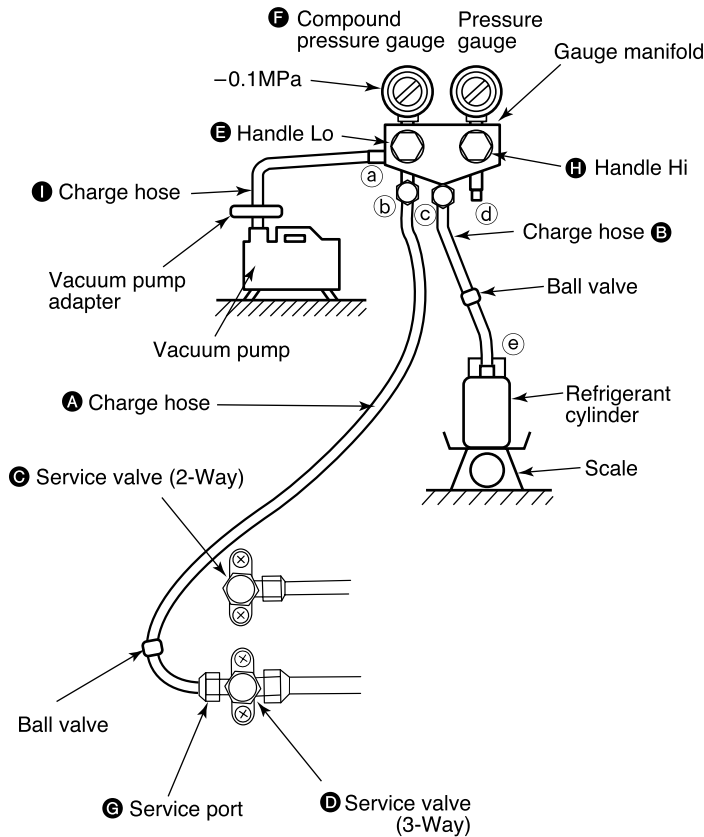
- In order to prevent any other refrigerant from being charged, R410A model is provided with the outdoor unit whose control valve has a different service port diameter (port size: 7/16 UNF 20 threads per inch → 1/2 UNF 20 threads per inch).
- In order to secure larger pressure resisting strength, flare expansion pipe dimensions and flare nut dimensions have been changed.

#### 〈New Tools for R410A〉

New tools for R410A	Applicable to HCFC-22 Model	Changes
Gauge manifold	×	As pressure is high, it is impossible to measure by means of conventional gauge. In order to prevent any other refrigerant from being charged, each port diameter has been changed.
Charge hose	×	In order to increase pressure resistance, hose materials and port size have been changed (to 1/2 UNF 20 threads per inch). When purchasing a charge hose, be sure to confirm the port size.
Electronic balance for refrigerant charging	○	As pressure is high and gasification speed is fast, it is difficult to read the indicated value by means of charging cylinder, as air bubbles occur.
Torque wrench	×	The opposite side dimensions of flare nuts increase. Incidentally, a common wrench is used for nominal diameters 1/4 and 3/8.
Flare tool (clutch type)	○	By increasing the clamp bar's receiving hole, strength of spring in the tool has been improved.
Gauge for projection adjustment	—	Used when performing flare processing by means of conventional flare tool.
Vacuum pump adapter	○	Connected to conventional vacuum pump.
Gas leakage detector	×	Exclusive for HFC refrigerant.

- Incidentally, the "refrigerant cylinder" comes with the refrigerant designation (R410A) and protector coating in the U.S.'s ARI specified rose color (ARI color code: PMS 507).
- Also, the "charge port and packing for refrigerant cylinder" require 1/2 UNF 20 threads per inch corresponding to the charge hose's port size.

#### 4. Servicing work (Refrigerant recharging)



**⚠ CAUTION**

1. Be sure to use the vacuum pump, vacuum pump adapter and gauge manifold to refer to their instruction manuals beforehand.
2. Ascertain that the vacuum pump is filled with oil to the level designated on the oil gauge.
3. After closed the ball valve of charge hose, it should be disconnected at service port side and refrigerant cylinder side at first.  
Next, after discharging the remained gas in the charge hose by opening the ball valve a little, disconnect it at gauge manifold side. You can prevent from being released the refrigerant suddenly by connecting the ball valve to service port. And you can work with more safety.

## Working steps

- 
- ```
graph TD; 1[1. Connect the charge hose A to outdoor unit.] --> 2[2. Connect the vacuum pump adapter to the vacuum pump. Connect the 1/2" conversion adapter to the vacuum pump adapter. Connect the charge hose 1 to the conversion adapter.]; 2 --> 3[3. Connect the charge hose B to the refrigerant cylinder.]; 3 --> 4[4. Open the handle Lo E.]; 4 --> 5[5. When the compound pressure gauge's pointer has indicated -0.1MPa, place the handle Lo E in the fully closed position.]; 5 --> 6[6. Remove the charge hose 1 of vacuum pump at portion a.]; 6 --> 7[7. Air purge of gauge manifold.]; 7 --> 8[8. Calculation of charged refrigerant amount.]; 8 --> 9[9. Charging of refrigeration.]; 9 --> 10[10. Completion of charging.]; 10 --> 11[11. Be closed the valve of charge hose A.]; 11 --> 12[12. Run the compressor at cooling operation.]; 12 --> 13[13. Remove the charge hose A & B.]; 13 --> 14[14. Attach the caps.]; 14 --> 15[15. Gas leakage check.];
```
1. Connect the charge hose **A** to outdoor unit.
2. Connect the vacuum pump adapter to the vacuum pump. Connect the 1/2" conversion adapter to the vacuum pump adapter. Connect the charge hose **1** to the conversion adapter.
- Then, service valve **C** & **D** is closed.
3. Connect the charge hose **B** to the refrigerant cylinder.
4. Open the handle Lo **E**.
- Turn ON the power switch of the vacuum pump & adapter.
- ↕ Run the vacuum pump in specified time.
5. When the compound pressure gauge's pointer has indicated -0.1MPa, place the handle Lo **E** in the fully closed position.
- Turn OFF the power switch of the vacuum pump & adapter.
6. Remove the charge hose **1** of vacuum pump at portion **a**.
7. Air purge of gauge manifold.
- Open the refrigerant cylinder's valve and push the valve core at portion **a** of gauge manifold. Then the refrigerant is discharge in a moment.
8. Calculation of charged refrigerant amount.
9. Charging of refrigeration.
- Open the handle Lo **E** in a turn and charge the designated amount.
10. Completion of charging.
11. Be closed the valve of charge hose **A**.
12. Run the compressor at cooling operation.
13. Remove the charge hose **A** & **B**.
- Remove the charge hose **A** rom portion **G**.
  - Remove the charge hose **B** from portion **e**.
14. Attach the caps.
15. Gas leakage check.

## MODEL RAF-25NH4, RAF-50NH4

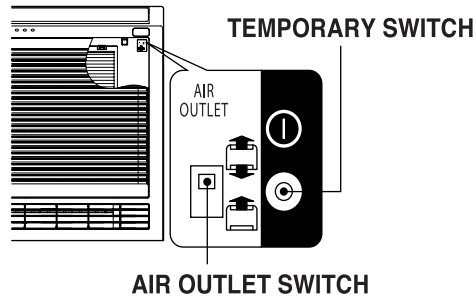
### 1. Top and Bottom Air Blow System

During heating, this air conditioner blows warm air from the bottom as well as from the top outlet as in previous models.

When the fan speed is set to "HI" or "AUTO" for cooling, the air conditioner blows cool air from both top and bottom, which allows rapid cooling. (This top / bottom cool air blow is possible for up to 25 minutes with the fan speed set to AUTO or HI. When the set room temperature is reached, the unit automatically switches to top blow only.)

#### (1) AIR OUTLET SWITCH

AIR OUTLET SWITCH IS SET TO 



#### COOLING OPERATION

- If cooling is started at an AUTO or HI fan speed setting, and if a considerable difference is present between the room temperature and preset temperature, the damper inside of the bottom air outlet will automatically open to allow cold air to also be directed out of the bottom side air outlet.

When the room temperature reaches the preset temperature or after approximately 30 minutes have elapsed from starting operation, cold air will automatically be directed only from the top side air outlet.

- When it is desirable to direct cold air from the bottom side air outlet for a longer period of time, set the temperature at 16°C and fan speed at HIGH. When the room temperature is more than 8°C above the preset temperature (16°C), cold air will continuously blow from the bottom side air outlet.

#### HEATING OPERATION

- As operation starts, warm air is automatically discharged from top and bottom side air outlets.
- When the room temperature reaches the preset temperature, air is directed only from top side air outlet at the LOW fan speed.

#### DEHUMIDIFYING OPERATION

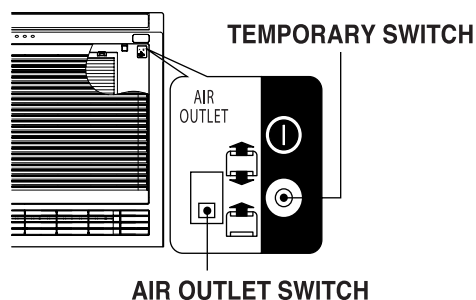
- For more efficient dehumidifying, the bottom side air outlet will remain closed.

#### FAN OPERATION

- Air blows out only from top side air outlet.


AIR OUTLET SWITCH IS SET TO 

- Air blows out only from top side air outlet in both heating and cooling operation.
- Air can be blown only from top side air outlet, to prevent blowing air striking your face during sleep, etc.
- If air blows out only from the top side air outlet, it takes more time to reach the set temperature when compared to air blowing from both top and bottom side air outlets. Also, temperature distribution within the room may be adversely affected. It is therefore recommended to use both top and bottom side air outlets whenever possible.





(2) Damper state in each operation mode

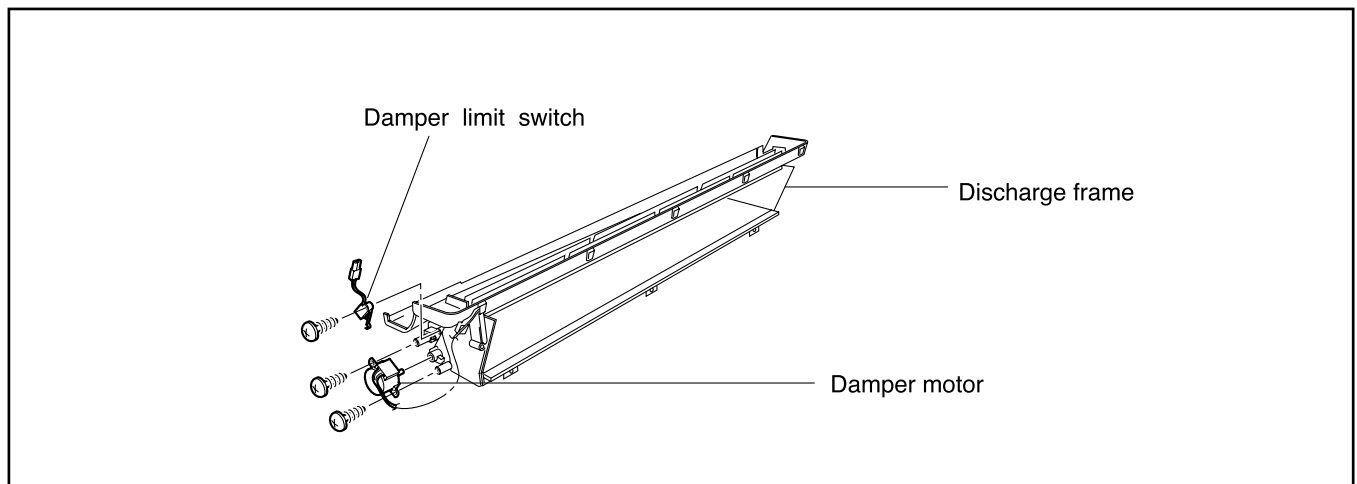
- If the Air outlet switch is set to , the damper at the bottom air outlet and air flow from the bottom will be as follows according to the settings of the operation switch and fan speed select buttons:

| Operation               | Fan speed                 | Damper and bottom blow-out states                                                                                                                                                                                                                                                                                                                                      | When the set room temperature is reached                          |
|-------------------------|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| Cooling                 | AUTO                      | Damper opens for 25 minutes maximum and air blows from bottom.<br>(But room temperature is more than 10°C higher than the set temperature.)                                                                                                                                                                                                                            | Damper closes and no air blows from bottom.                       |
|                         | HI                        | Damper opens for 25 minutes maximum and air blows from bottom.<br>(But room temperature is more than 9°C higher than the set temperature.)<br><br>However, if the temperature and fan speed are set to "16°C" and "HI" respectively, air continuously blows out from the bottom while the room temperature is more than 8°C higher than the preset temperature "16°C". | Damper closes and no air blows from bottom.                       |
|                         | MED or LOW                | Damper stays closed and no air blows from bottom.                                                                                                                                                                                                                                                                                                                      | ——                                                                |
| Heating                 | Each speed including AUTO | Damper opens and air also blows from bottom.                                                                                                                                                                                                                                                                                                                           | Damper closes and air blows from top in ultra-low fan speed mode. |
| Sensor dry              | Each speed including AUTO | Damper stays closed and no air blows from bottom.                                                                                                                                                                                                                                                                                                                      | The upper fan also stops.                                         |
| Fan                     | Each speed including AUTO | Damper stays closed and no air blows from bottom.                                                                                                                                                                                                                                                                                                                      | ——                                                                |
| Preheating / Defrosting | Each speed including AUTO | When the HOT KEEP lamp is lit, the damper closes and no air blows from bottom.                                                                                                                                                                                                                                                                                         | ——                                                                |

- The ratio of air discharge volume is: Upper: About 60% and Lower: About 40%.

## 2. Damper Mechanism

### (1) Disassembly diagram of damper mechanism

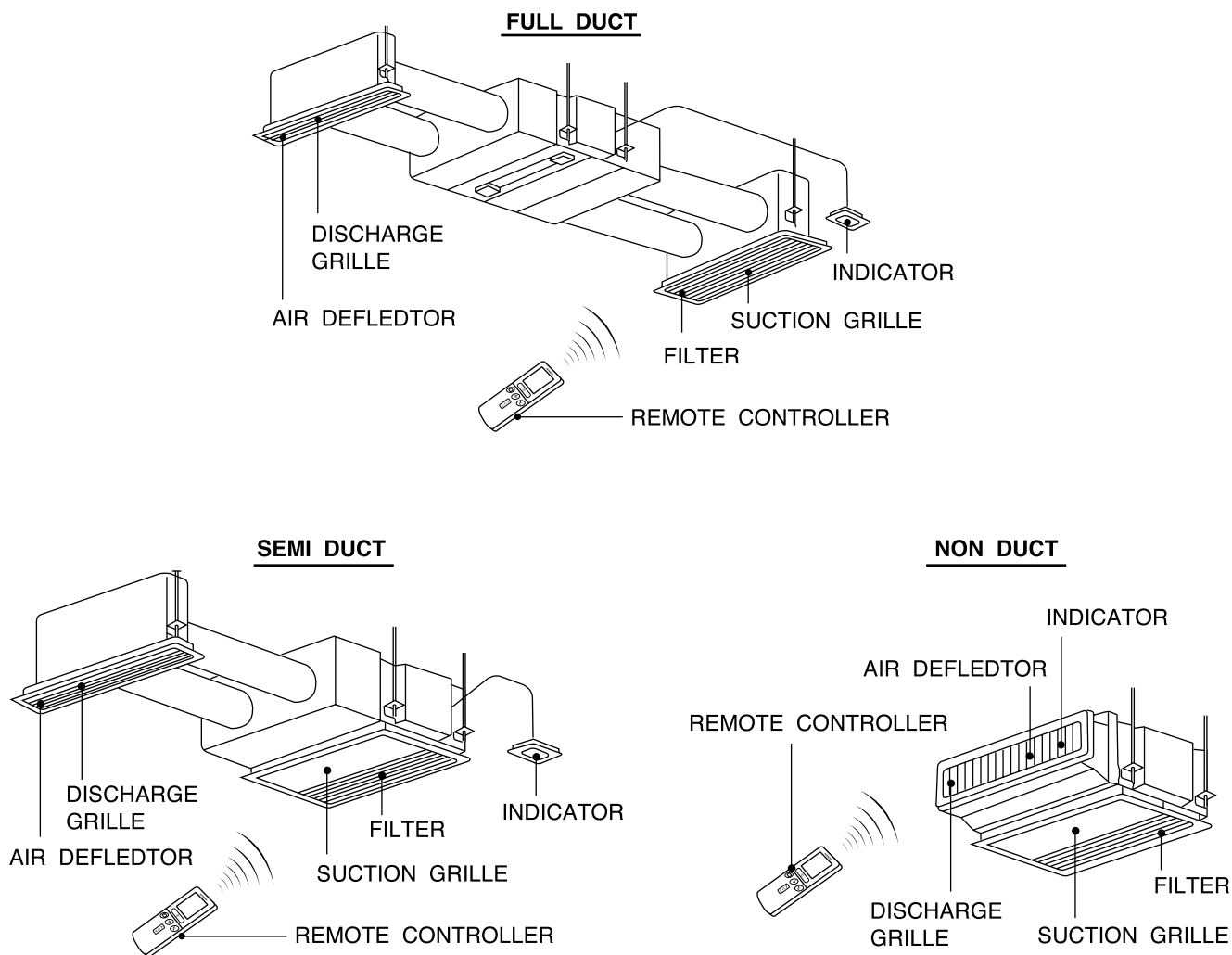


### (2) Damper operation theory

The damper and the link connected to the damper moves at the same time by turning the motor.

|                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                           |
|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|
| <p>Damper closed state</p> | <p>This diagram shows the damper in the closed state. The damper is tilted upwards, and the link is in a position that triggers the damper limit switch. The damper driving motor shaft is shown at the bottom. The link movement direction is indicated by an arrow. The drain pan is shown at the top right. The diagram is labeled with 'Damper', 'Damper limit switch', 'Damper driving motor shaft', 'Link movement direction', 'Link', and 'Drain pan'.</p> | <p>Damper limit switch is set to ON.</p>  |
| <p>Damper open state</p>   | <p>This diagram shows the damper in the open state. The damper is tilted downwards, and the link is in a position that does not trigger the damper limit switch. The damper driving motor shaft is shown at the bottom. The diagram is labeled with 'Link'.</p>                                                                                                                                                                                                   | <p>Damper limit switch is set to OFF.</p> |

1. The indoor unit includes a built-in drain pump, and draining is performed from the upper part of the indoor unit.
2. Installation can be selected from three thpes of duct conditions.



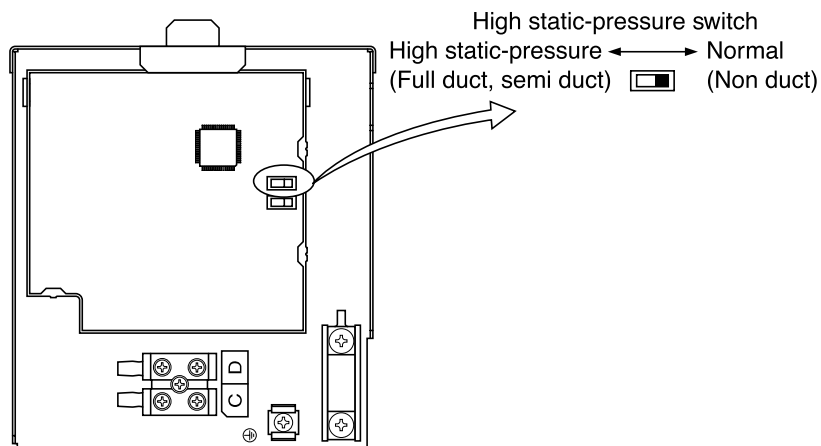
3. Set the switch according to the installation condition.

#### •Setting of switches

##### (1) High static-pressure switch

(Full duct type and semi duct type)

- For full duct type and semi duct type, set the high static-pressure switch to HIGH STATIC-PRESSURE.
- If not set to HIGH STATIC-PRESSURE, there will be reduction of cooling and heating capacities.

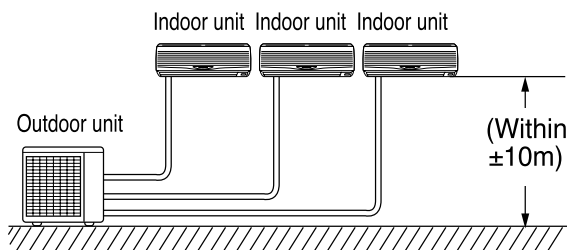


## INSTALLATION

### Height difference

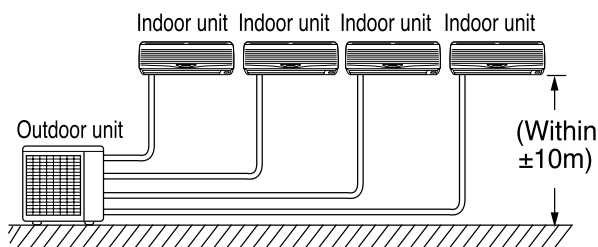
#### RAM-70QH4

Height difference between indoor units should be not more than 5m.



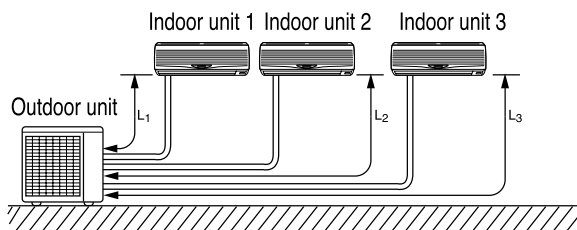
#### RAM-80QH4

Height difference between indoor units should be not more than 5m.



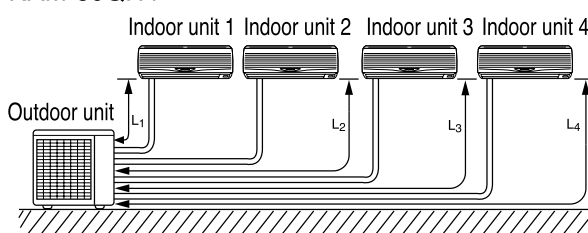
### Piping length

#### RAM-70QH4



$L_1 + L_2 + L_3 = \text{Maximum } 60\text{m}$   
 (However,  $L_1 + L_2 = \text{Maximum } 35\text{m}$ )  
 Maximum piping length for one indoor unit is 25m.  
 \* Additional charge of refrigerant is not required.

#### RAM-80QH4



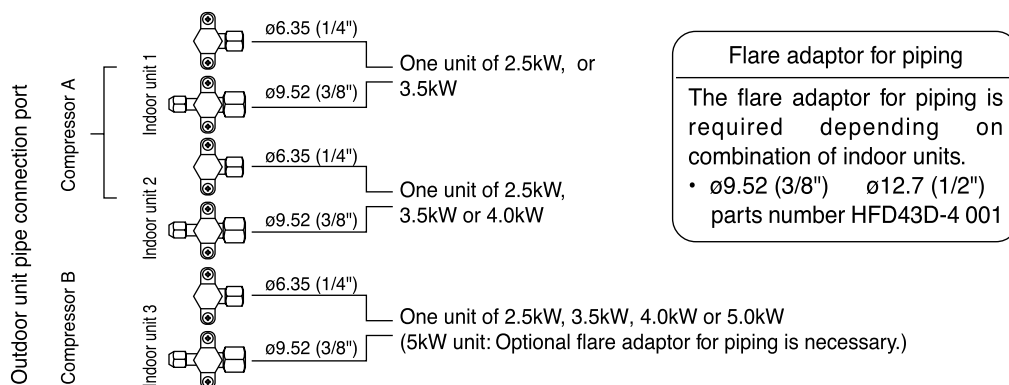
$(L_1 + L_2) = (L_3 + L_4) = \text{Maximum } 35\text{m}$   
 Maximum piping length for one indoor unit is 25m.  
 \* Additional charge of refrigerant is not required.

## [Outdoor unit installation]

- The pipe connection ports of the outdoor unit and connectable indoor units are shown below. (Connection of the compressors is as shown below.)

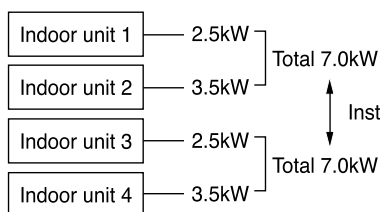
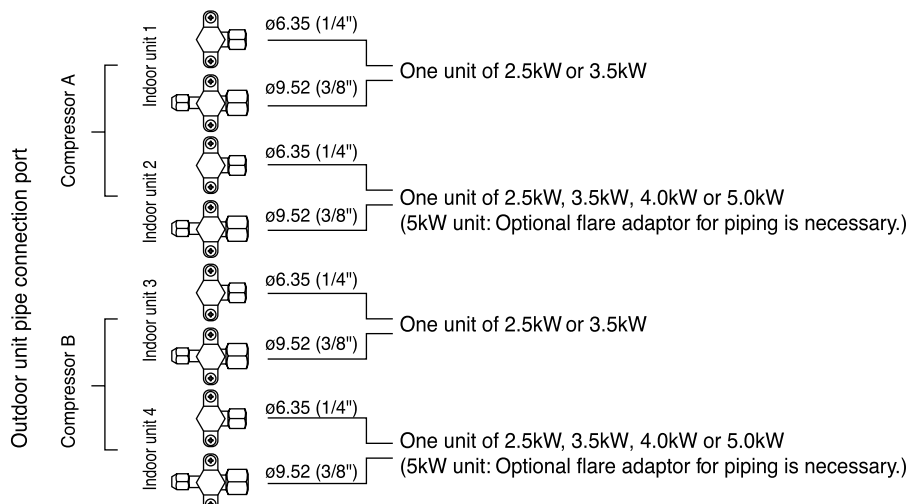
### RAM-70QH4

- To the outdoor unit, up to three indoor units can be connected until the total value of each unit's capacity from 5.0kW to 11.0kW.



### RAM-80QH4

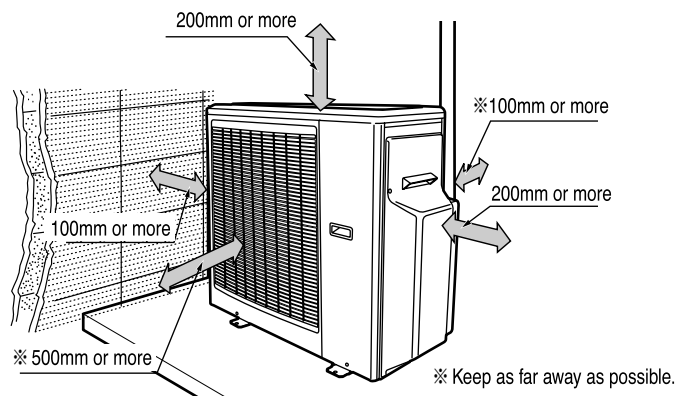
- To the outdoor unit, up to four indoor units can be connected until the total value of each unit's capacity reaches 12.0kW. However, install indoor units so that total capacity of Indoor unit 1 and Indoor unit 2 and total capacity of Indoor unit 3 and Indoor unit 4 are approached. For example, when two 2.5kW units and two 3.5kW units are to be connected, connect as shown below.
- Connect 3 or more indoor units. If only two units are to be connected, connect them as Indoor unit 1 and Indoor unit 2 or Indoor unit 3 and Indoor unit 4. However, when two 3.5kW units are connected or when one 2.5kW unit and one 4kW unit are connected, capacity may be less than indicated capacity.



Total capacity of 4 units:  
12.0kW or less

Install so that both total capacities are approached.

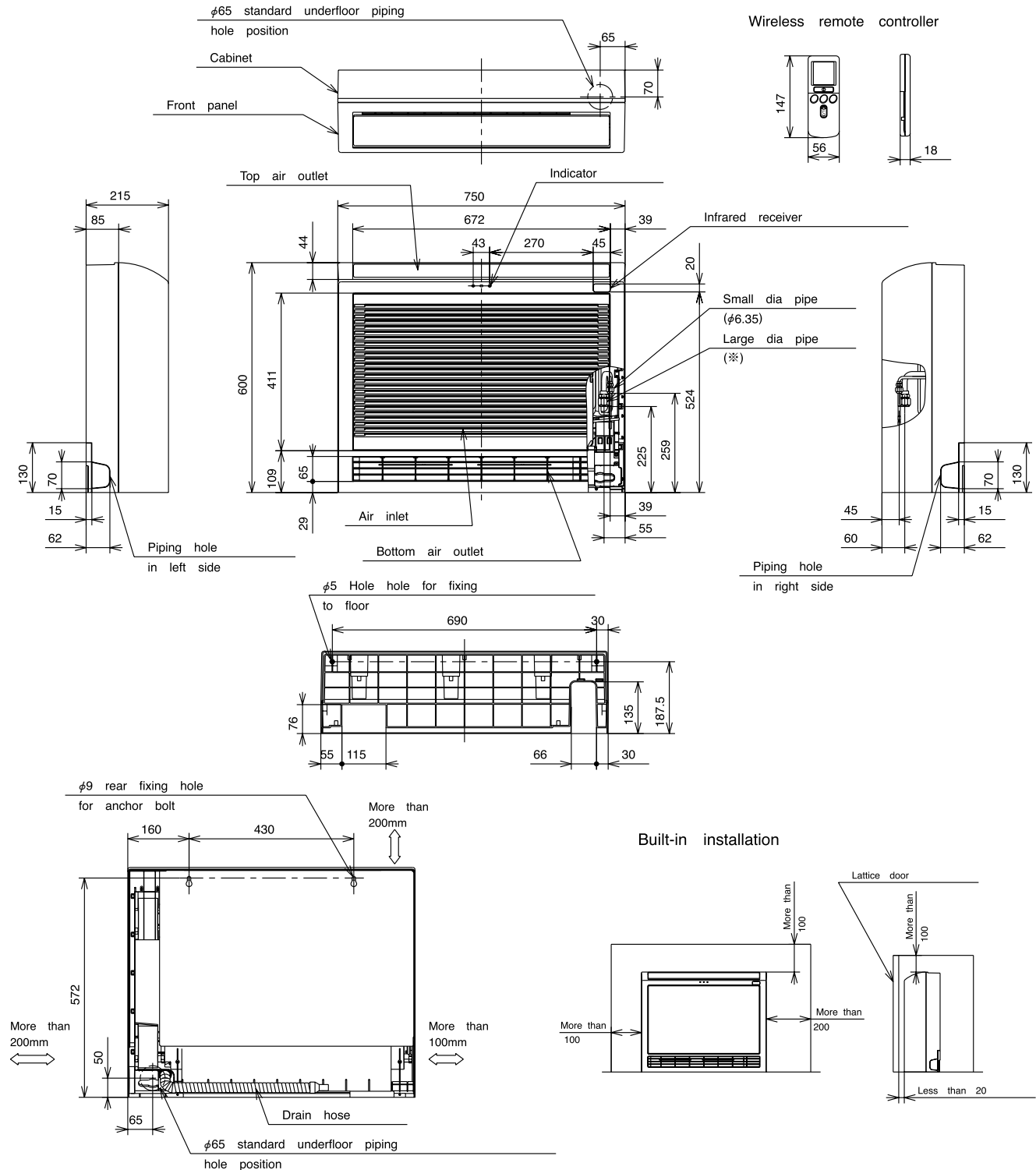
- Remove electric box cover and three cord bands. Then, remove side panel and front panel in sequence. (If side panel cannot be removed at this time, remove top cover.)



# CONSTRUCTION AND DIMENSIONAL DIAGRAM

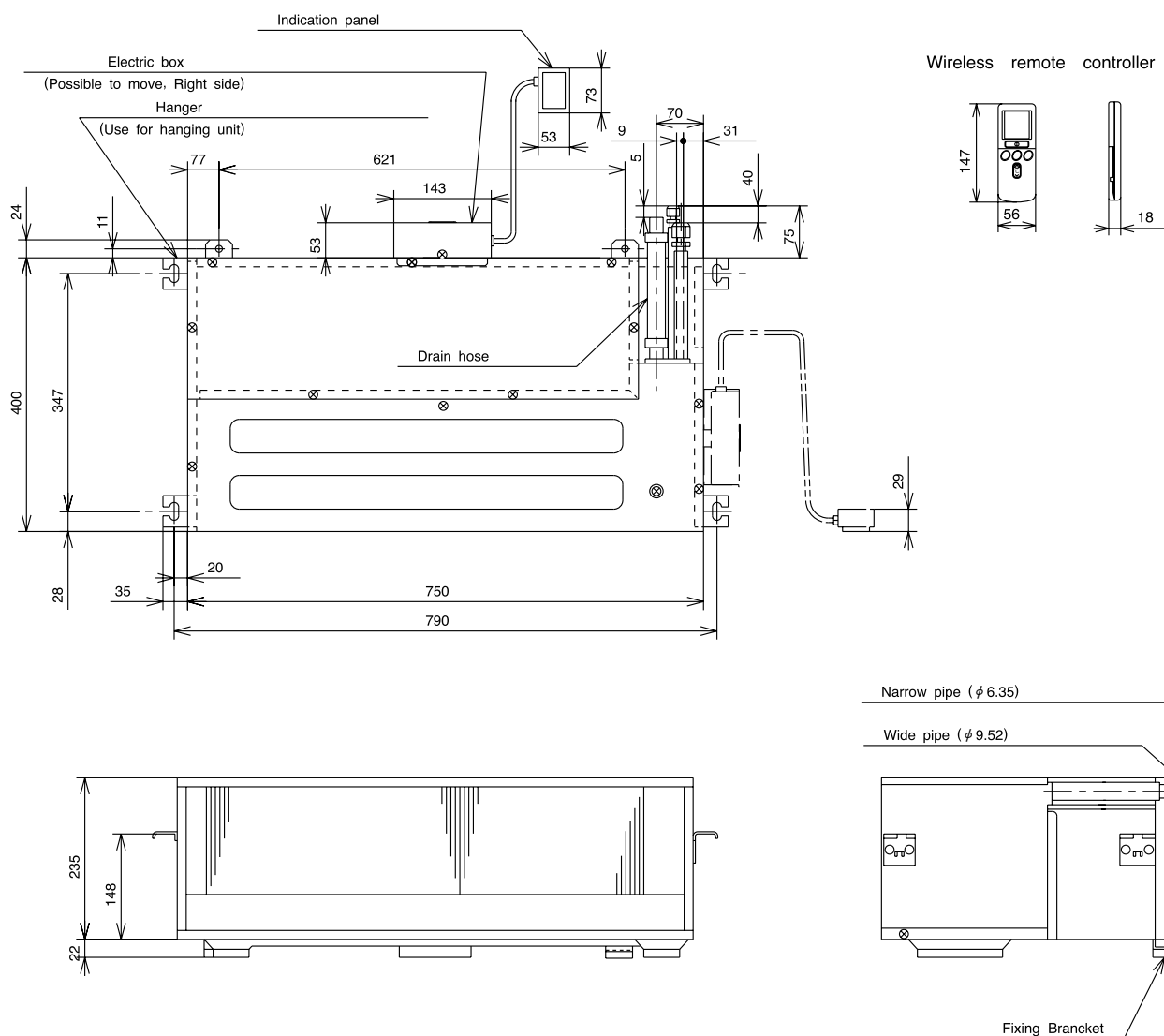
MODEL RAF-25NH4, RAF-50NH4

Unit: mm



## Cautions:

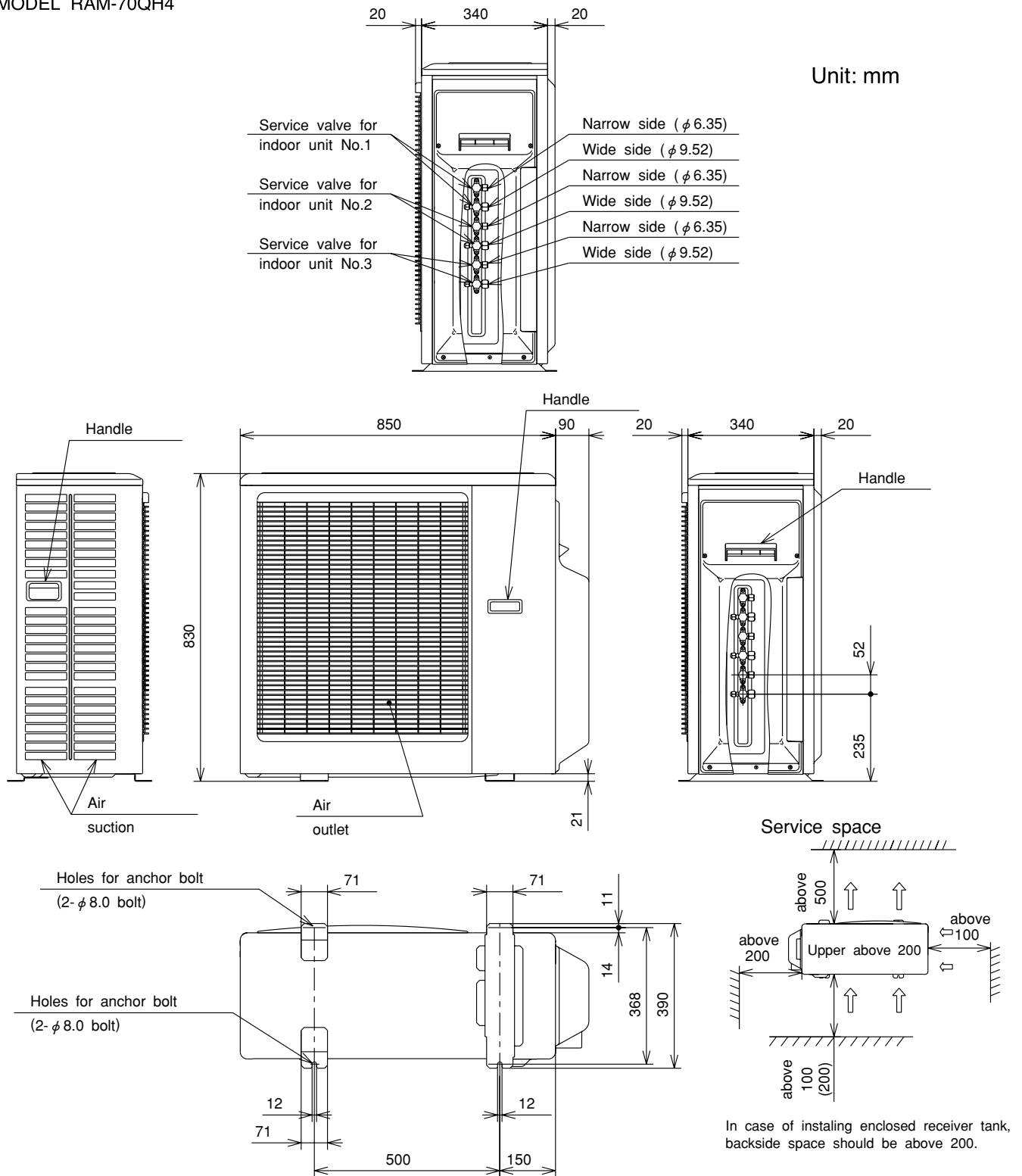
1. Use insulated pipes for both large and small diameters.
  2. Make sure the difference in heights between the indoor and outdoor units is 10m.
  3. For built-in installation, make sure that the infrared receiver and indicator are not blocked.
  4. Pipes can be laid out from the right, bottom or rear, when the unit is viewed from front.
  5. Keep the clearance shown by  $\longleftrightarrow$  for installation.
  6. For built-in installation, keep the vertical deflector at the top air outlet as flat as possible.  
If it is inclined too much, heat will be trapped in the unit, which could cause faulty room temperature.
  7. A connection cable 1.6mm or 2.0mm dia. X2 (control side) is used for the connection cable.
- ※ RAF-25NH4 → φ9.52, RAF-50NH4 → φ12.7



Cautions:

1. Use insulated pipes for both large and small diameters.
2. An connection cable.

Unit: mm



Note:

1. The way to connect piping sets is flare type coupling.
2. Insulated pipes should be used for both the narrow and wide dia. pipes.

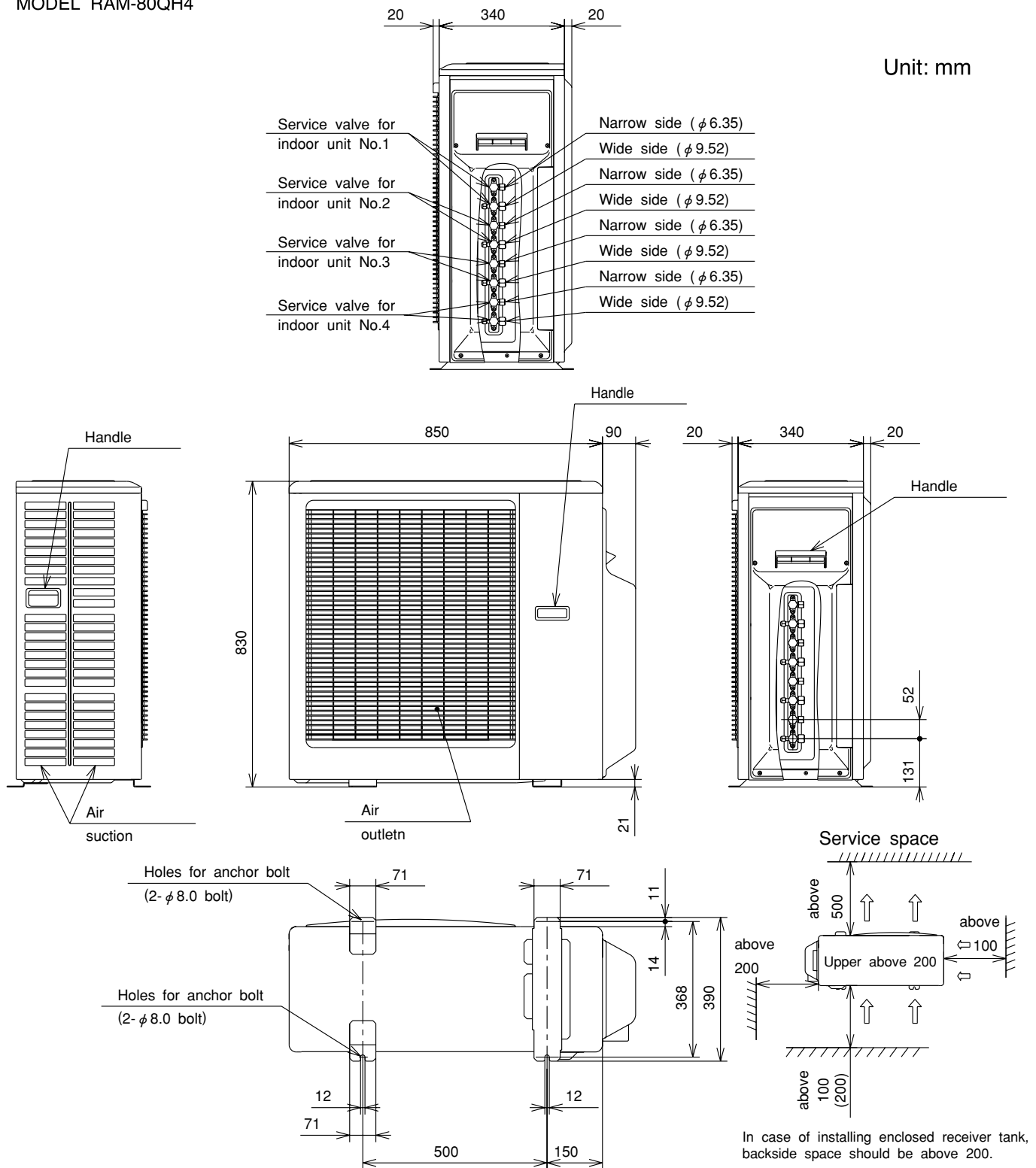
ATTENTION

During service, before opening the side panel, please switch off power supply and disconnect power cord and connecting cord.

After service has been completed, please replace side panel, reconnect power cord and connecting cord respectively before turning on power.



Unit: mm



Note:

1. The way to connect piping sets is flare type coupling.
2. Insulated pipes should be used for both the narrow and wide dia. pipes.

ATTENTION

During service, before opening the side panel, please switch off power supply and disconnect power cord and connecting cord.

After service has been completed, please replace side panel, reconnect power cord and connecting cord respectively before turning on power.

## MAIN PARTS COMPONENT

## PRINCIPAUX COMPOSANTS

THERMOSTAT THERMOSTAT

Thermostat Specifications

Caractéristiques du thermostat

| MODEL                      MODÈLE                          |                                |              | RAF-25NH4, RAF-50NH4 |                | RAD-25QH4, RAD-40QH4 |                |
|------------------------------------------------------------|--------------------------------|--------------|----------------------|----------------|----------------------|----------------|
| THERMOSTAT MODEL                      MODÈLE DE THERMOSTAT |                                |              | IC                   |                |                      |                |
| OPERATION MODE                      MODE DE FONCTIONNEMENT |                                |              | COOL REFRIGERATION   | HEAT CHALEUR   | COOL REFRIGERATION   | HEAT CHALEUR   |
| TEMPERATURE<br>TEMPERATURE<br>°C (°F)                      | INDICATION<br>INDICATION<br>16 | ON    MARCHÉ | 15.7    (60.3)       | 19.0    (66.2) | 14.9    (59.3)       | 20.4    (68.8) |
|                                                            |                                | OFF    ARRÊT | 15.0    (59.0)       | 19.7    (67.5) | 14.3    (58.3)       | 21.0    (69.1) |
|                                                            | INDICATION<br>INDICATION<br>24 | ON    MARCHÉ | 23.7    (74.7)       | 27.0    (80.6) | 22.9    (43.7)       | 28.4    (83.1) |
|                                                            |                                | OFF    ARRÊT | 23.0    (73.4)       | 27.7    (81.9) | 22.3    (72.7)       | 29.0    (84.1) |
|                                                            | INDICATION<br>INDICATION<br>32 | ON    MARCHÉ | 31.7    (89.1)       | 35.0    (95.0) | 30.9    (88.1)       | 36.4    (97.7) |
|                                                            |                                | OFF    ARRÊT | 31.0    (87.8)       | 35.7    (96.3) | 30.3    (87.1)       | 37.0    (98.8) |

FAN MOTOR MOTEUR DE VENTILATEUR

Fan Motor Specifications

Caractéristiques du moteur de ventilateur

| MODEL MODÈLE                     |  | RAF-25NH4, RAF-50NH4              | RAD-25QH4, RAD-40QH4 |
|----------------------------------|--|-----------------------------------|----------------------|
| POWER SOURCE ALIMENTATION SORTIE |  | DC : 5V, DC : 0 - 35V             | DC : 0 - 300V        |
| OUT PUT MODE DE FONCTIONNEMENT   |  | 20W (MAX40)                       | 50W                  |
| CONNECTION<br>CONNEXION          |  | <p>(Control circuit built in)</p> |                      |

BLU : BLUE  
BLEU

YEL : YELLOW  
JAUNE

BRN : BROWN  
BRUN

WHT : WHITE  
BLANC

GRY : GRAY  
GRIS

ORN : ORANGE  
ORANGE

GRN : GREEN  
VERT

RED : RED  
ROUGE

BLK : BLACK  
NOIR

PNK : PINK  
ROSE

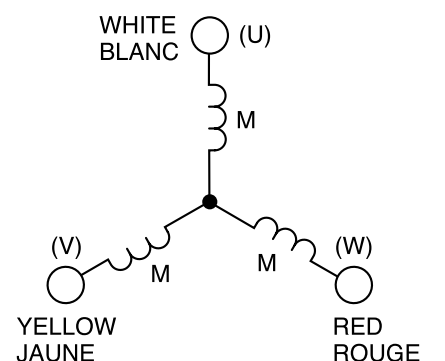
VIO : VIOLET  
VIOLET

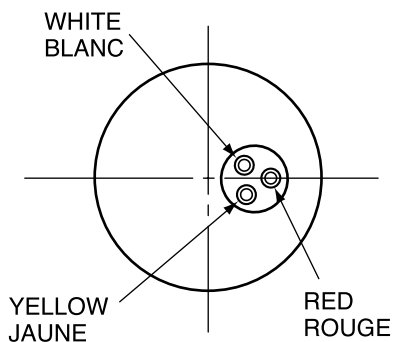
## COMPRESSOR

## COMPRESSEUR

## Compressor Motor Specifications

## Caractéristiques du moteur de compresseur

|                                          |                       |                                                                                    |           |
|------------------------------------------|-----------------------|------------------------------------------------------------------------------------|-----------|
| MODEL                                    | MODÈLE                | RAM-70QH4, RAM-80QH4                                                               |           |
| COMPRESSOR MODEL                         | MODÈLE DE COMPRESSEUR | EU1013DD x 2                                                                       |           |
| PHASE                                    | PHASE                 | SINGLE SIMPLE                                                                      |           |
| RATED VOLTAGE                            | TENSION NOMINALE      | 230V                                                                               |           |
| RATED FREQUENCY                          | FREQUENCE NOMINALE    | 50Hz                                                                               |           |
| POLE NUMBER                              | NOMBRE DE POLE        | 4                                                                                  |           |
| CONNECTION<br>CONNEXION                  |                       |  |           |
| RESISTANCE VALUE<br>VALEUR DE RESISTANCE | (Ω)                   | 20°C<br>(68°F)                                                                     | 2M = 0.83 |
|                                          |                       | 75°C<br>(167°F)                                                                    | 2M = 1.01 |

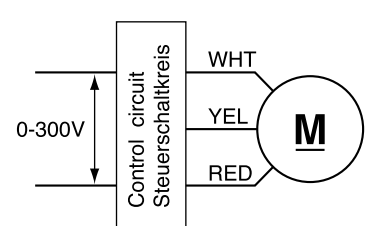


## FAN MOTOR

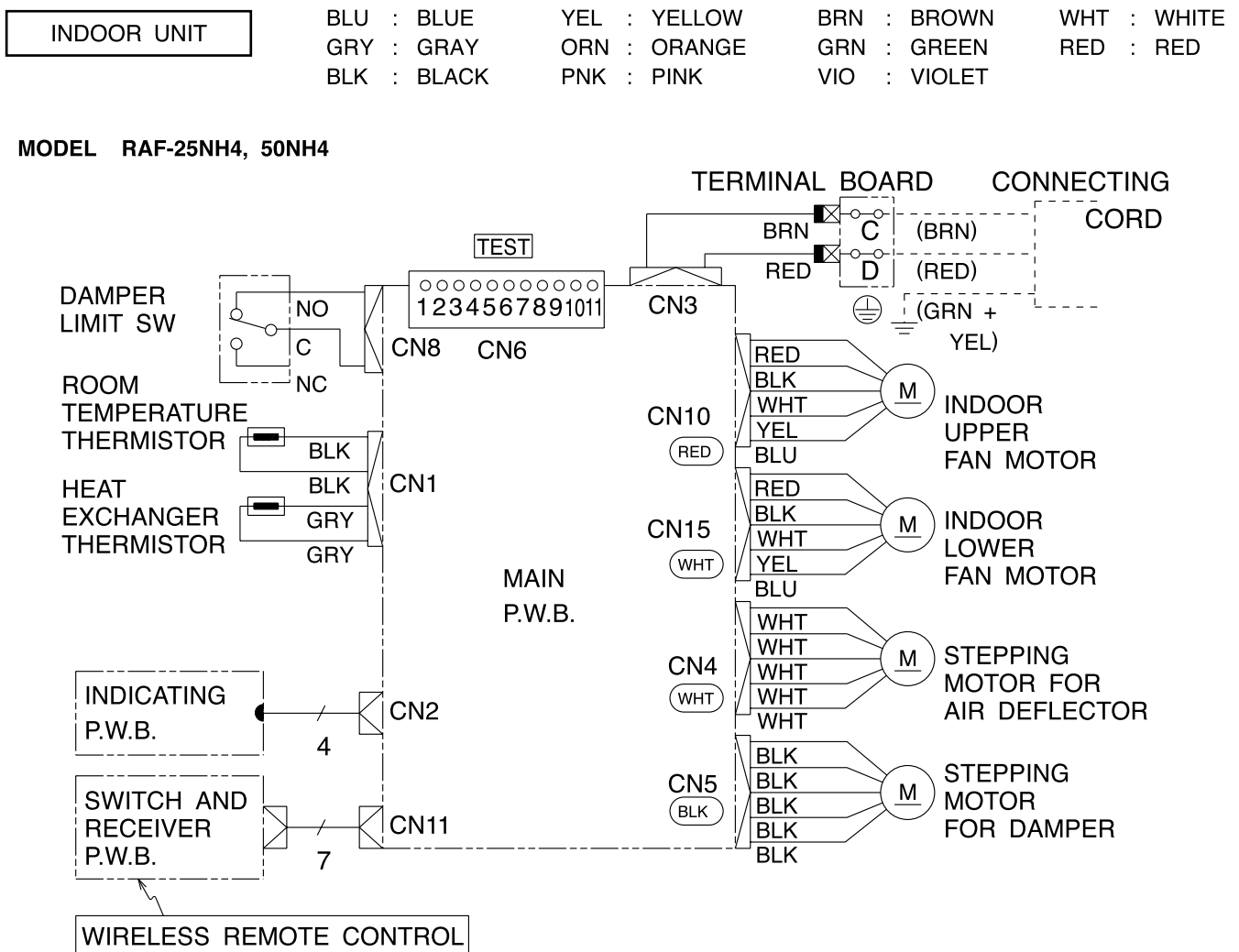
## MOTEUR DE VENTILATEUR

## Fan Motor Specifications

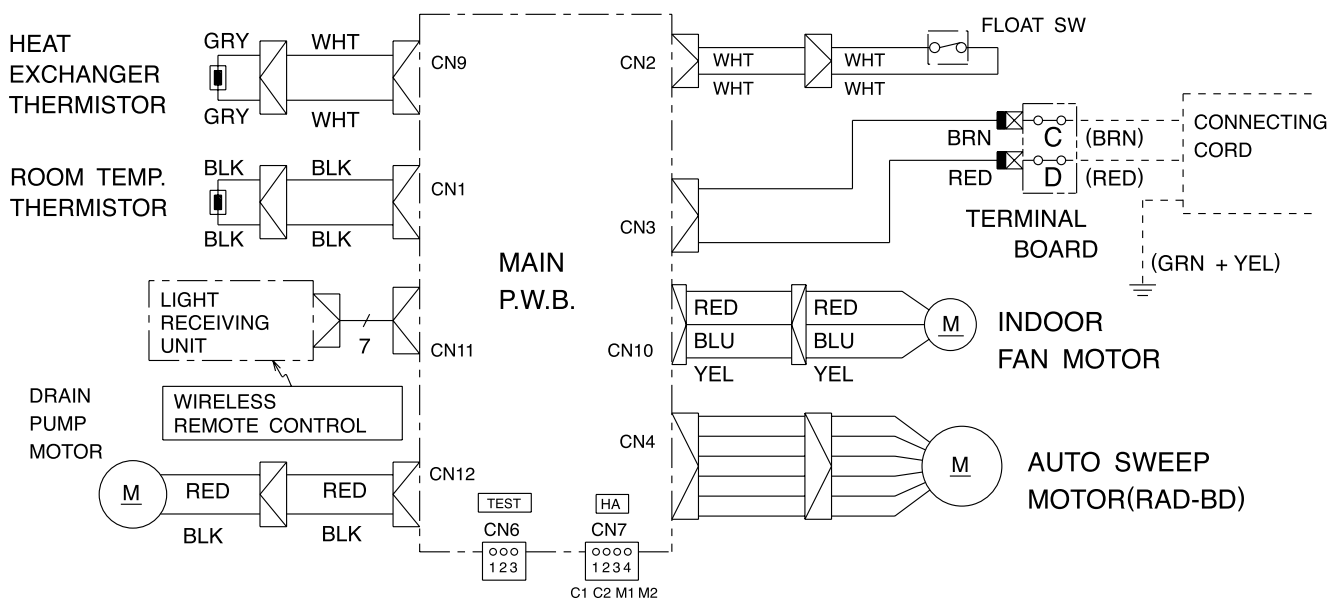
## Caractéristiques du moteur de ventilateur

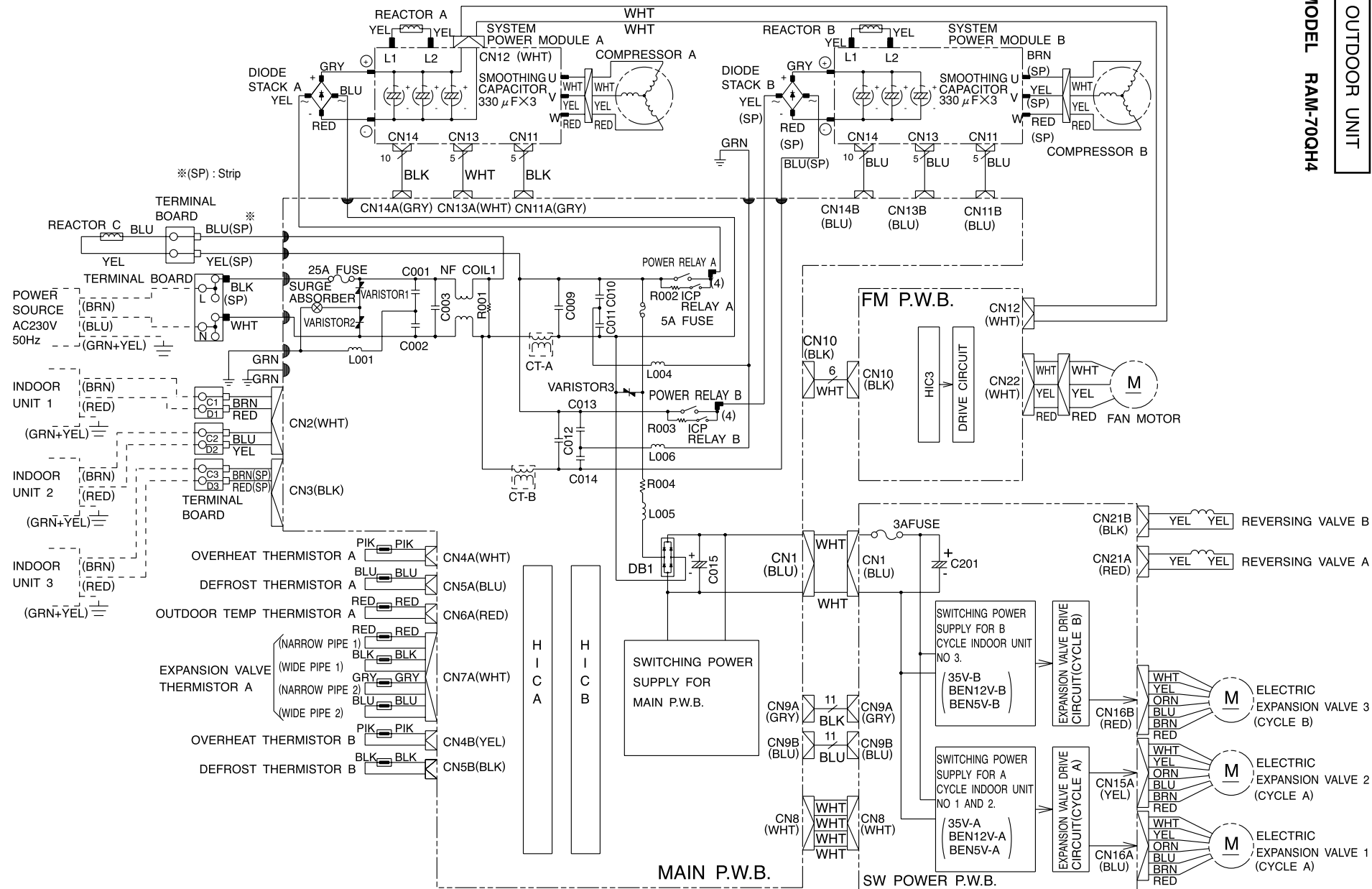
|                         |                        |                                                                                      |  |
|-------------------------|------------------------|--------------------------------------------------------------------------------------|--|
| MODEL                   | MODÈLE                 | RAM-70QH4, RAM-80QH4                                                                 |  |
| POWER SOURCE            | ALIMENTATION SORTIE    | DC : 0 - 300V, CC : 0 - 300V                                                         |  |
| OUT PUT                 | MODE DE FONCTIONNEMENT | 50W                                                                                  |  |
| CONNECTION<br>CONNEXION |                        |  |  |

## WIRING DIAGRAM



**MODEL RAD-25QH4, 40QH4**

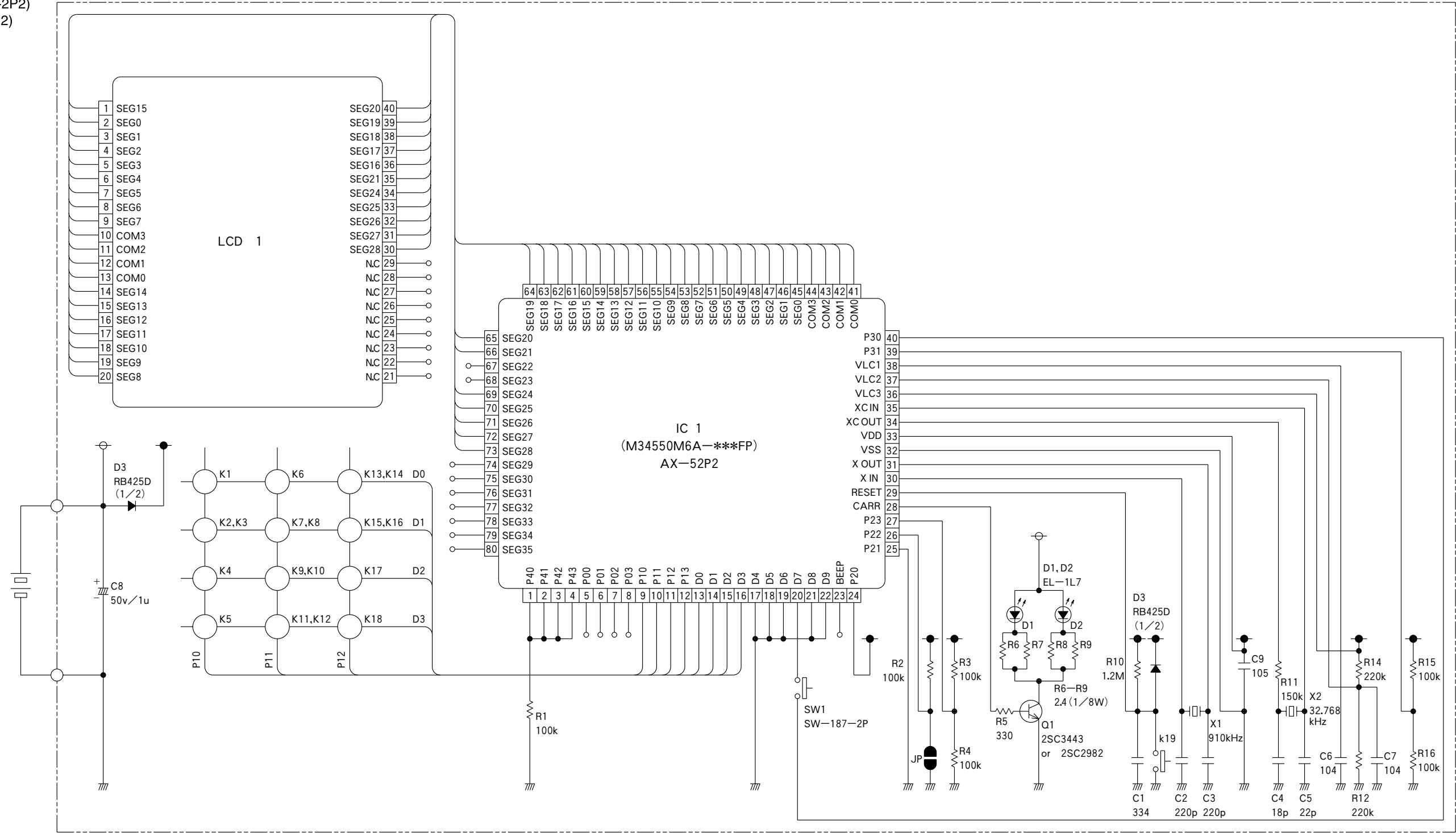






WIRING DIAGRAM OF THE PRINTED WIRING BOARD  
SCHÉMA ELECTRIQUE DU CIRCUIT IMPRIMÉ

Remote controller (RAR-2P2)  
Télécommande (RAR-2P2)



Key matrix table

| output |           | D0         | D1                  | D2                    | D3                 |
|--------|-----------|------------|---------------------|-----------------------|--------------------|
| input  | Door open | Start/Stop | Operation selection | Fan speed selection   | —                  |
|        | Door shat | Start/Stop | Dry                 | —                     | —                  |
| P11    | Door open | On timer   | Hour up             | Hour down             | Dry • present time |
|        | Door shat | —          | Room temperature up | Room temperature down | —                  |
| P12    | Door open | Off timer  | —                   | Reservation           | Cancel             |
|        | Door shat | Sleep      | —                   | —                     | —                  |
| P13    | Door open | —          | —                   | —                     | —                  |
|        | Door shat | —          | —                   | —                     | —                  |

Tableau matriciel des touches:

| Sortie |              | D0                            | D1                              | D2                                     | D3                    |
|--------|--------------|-------------------------------|---------------------------------|----------------------------------------|-----------------------|
| Entée  | Volet ouvert | Marche/arrêt                  | Choix du mode                   | Sélection de la vitesse de ventilation | —                     |
|        | Volet fermé  | Marche/arrêt                  | Déshumidification               | —                                      | —                     |
| P11    | Volet ouvert | Programmeur de mise en marche | Heure croissante                | Heure décroissante                     | Jour • heure actuelle |
|        | Volet fermé  | —                             | Température de pièce croissante | Température de pièce décroissante      | —                     |
| P12    | Volet ouvert | Programmeur d'arrêt           | —                               | Attente                                | Annulation            |
|        | Volet fermé  | Veille                        | —                               | —                                      | —                     |
| P13    | Volet ouvert | —                             | —                               | —                                      | —                     |
|        | Volet fermé  | —                             | —                               | —                                      | —                     |





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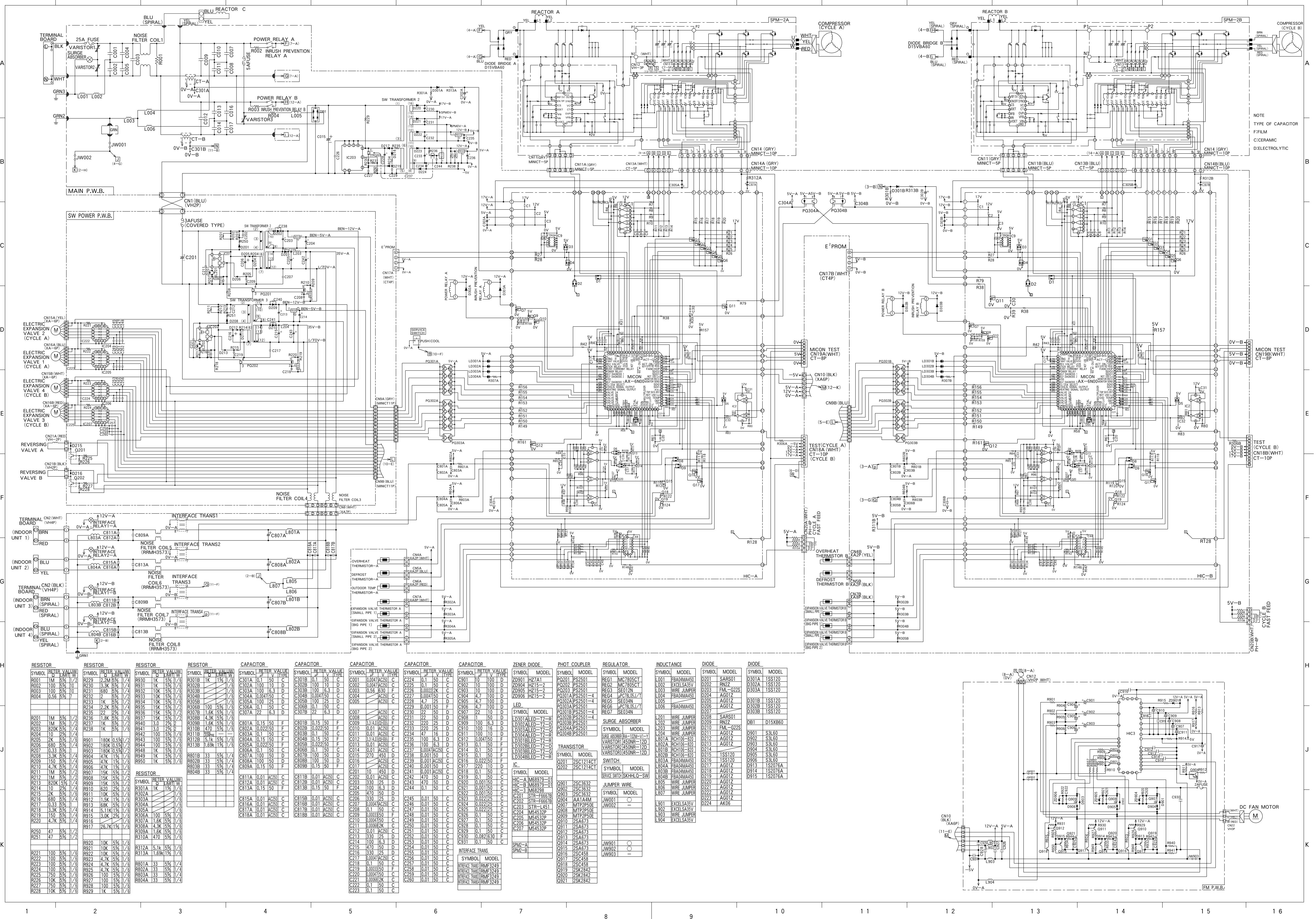
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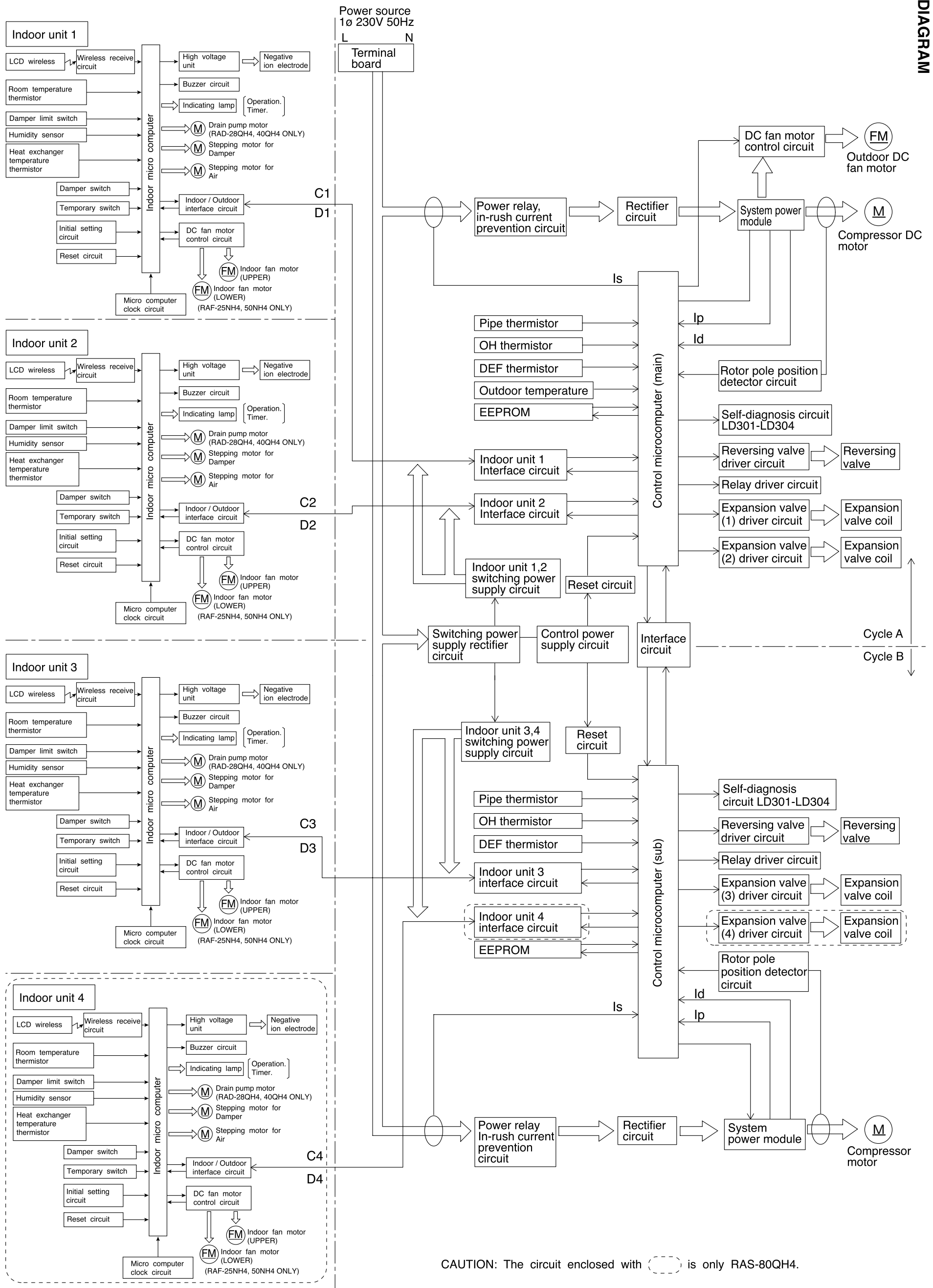
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BASIC MODE

MODEL RAF-25NH4, RAF-50NH4, RAD-25QH4, RAD-40QH4

| Operation mode                            |                                                                                                            | Fan                                                                                                                                                                                                                         | Cooling                                                                                                                                                                                            | Dehumidifying                                                                                                                                                                                                                                                                                                                                                          | Heating                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Auto                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                         |                              |                                                      |                                                                                            |                                                           |                                                                              |
|-------------------------------------------|------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|------------------------------|------------------------------------------------------|--------------------------------------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------------------------|
| Basic operation of start / stop switch    |                                                                                                            | <div>Start / stop switch</div> <div>Operation lamp</div>                                                                                                                                                                    |                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                         |                              |                                                      |                                                                                            |                                                           |                                                                              |
| Timer functions                           | Off-timer                                                                                                  | <div>Start / stop switch</div> <div>Reserve switch</div> <div>Cancel switch</div> <div>Operation lamp</div> <div>Timer lamp</div> <div>Timer memory</div> <div>(Off-timer during stop) (Change in reserved time)</div>      |                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                         |                              |                                                      |                                                                                            |                                                           |                                                                              |
|                                           | On-timer                                                                                                   | <div>Start / stop switch</div> <div>Reserve switch</div> <div>Cancel switch</div> <div>Operation lamp</div> <div>Timer lamp</div> <div>Timer memory</div> <div>(Change in reserved time) (Off-timer during operation)</div> |                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                         |                              |                                                      |                                                                                            |                                                           |                                                                              |
| Fan speed mode (indoor fan)               | Auto                                                                                                       |                                                                                                                                                                                                                             | <div>Changes from "Hi" to "Med" or "Lo" depending on room temperature.</div> <div>1. Runs at "Hi" until first thermo off after operation is started.<br/>2. Runs at "Lo" when thermo is off.</div> |                                                                                                                                                                                                                                                                                                                                                                        | <div>Set to "Ultra-Lo", "Lo", "Med", "Hi", "Ultra-Hi" or "stop" depending on the room temperature, time and heat exchange temperature. Set to "stop" if the room temperature is 18°C in the "Ultra-Lo" mode other than during preheating (cooling is recovered at 18.33°C).</div> <div>When the compressor is running at maximum speed during hot dash or when recovered from defrosting.</div> <div>In modes other than left</div> <div>Heat exchanger temperature</div> | <div>The neuro &amp; fuzzy control allows device to determine optimum operation mode and set temperature. However, during auto cooling, the new cool rhythm starts when the room temperature is less than the set temperature plus 0.66°C, after dash is finished.</div>                                                               | <div>The special auto mode is based on N&amp;F auto, but the following is different:</div> <table><tr><th>Operation mode</th><th>Mode change during operation</th></tr><tr><td>N&amp;F auto</td><td>Does not change as long as auto door temperature or calendar data does not change greatly.</td></tr><tr><td>Special auto</td><td>The operation mode will be judged the same as at operation start every hour.</td></tr></table> <div>The special auto operation mode is entered when operation is started in the following status:</div> <div>&lt;Start condition&gt;<br/>Power is supplied while the tele-control signal is being input. (Operation starts automatically.)</div> <div>&lt;End condition&gt;<br/>The remote control restores the normal operation mode.</div> <div>Note<br/>(1) Since there is no stored calendar data, N&amp;F control is not determined. See Note (2) of N&amp;F auto.</div> | Operation mode                          | Mode change during operation | N&F auto                                             | Does not change as long as auto door temperature or calendar data does not change greatly. | Special auto                                              | The operation mode will be judged the same as at operation start every hour. |
|                                           | Operation mode                                                                                             | Mode change during operation                                                                                                                                                                                                |                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                         |                              |                                                      |                                                                                            |                                                           |                                                                              |
|                                           | N&F auto                                                                                                   | Does not change as long as auto door temperature or calendar data does not change greatly.                                                                                                                                  |                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                         |                              |                                                      |                                                                                            |                                                           |                                                                              |
|                                           | Special auto                                                                                               | The operation mode will be judged the same as at operation start every hour.                                                                                                                                                |                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                         |                              |                                                      |                                                                                            |                                                           |                                                                              |
| Hi                                        | Operates at "Hi" regardless of the room temperature.                                                       | Set to "Ultra-Hi" when the compressor runs at maximum speed, and to "Hi" in other modes.                                                                                                                                    |                                                                                                                                                                                                    | Set to "Ultra-Lo", "Lo", "Med", "Hi", "Ultra-Hi" or "Stop" depending on the room temperature and time.<br>Set to "Stop" if the room temperature is 18°C in the "Ultra-Lo" mode other than during preheating (cooling is recovered at 18.33°C).<br>Set to "Ultra-Hi" when the compressor is running at maximum speed during hot dash or when recovered from defrosting. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                         |                              |                                                      |                                                                                            |                                                           |                                                                              |
| Med                                       | Operates at "Med" regardless of the room temperature.                                                      | Same as at left.                                                                                                                                                                                                            |                                                                                                                                                                                                    | Set to "Ultra-Lo", "Lo", "Med" or "Stop" depending on the room temperature and time.<br>Set to "Stop" if the room temperature is 18°C in the "Ultra-Lo" mode other than during preheating (cooling is recovered at 18.33°C).                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                         |                              |                                                      |                                                                                            |                                                           |                                                                              |
| Lo                                        | Operates at "Lo" regardless of the room temperature.                                                       | Same as at left.                                                                                                                                                                                                            | Set to "Lo" in modes other than when the compressor stops.                                                                                                                                         | Set to "Ultra-Lo", "Lo", or "Stop" depending on the room temperature and time.<br>Set to "Stop" if the room temperature is 18°C in the "Ultra-Lo" mode other than during preheating (cooling is recovered at 18.33°C).<br>The fan speed is controlled by the heat exchanger temperature; the overload control is executed as in the following diagram:                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                         |                              |                                                      |                                                                                            |                                                           |                                                                              |
| Basic operation of temperature controller | Performs only fan operation at the set speed regardless of the room temperature.                           | See page 127.                                                                                                                                                                                                               | See page 133.                                                                                                                                                                                      | See page 137.                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <div>Room temperature at operation start (°C)</div> <table><tr><td>Cooling</td><td>Set temperature: 28°C<br/>Fan mode: Auto</td></tr><tr><td>Dehumidifying</td><td>Set temperature: Room temperature at operation start</td></tr><tr><td>Heating</td><td>Fan mode: Auto<br/>Set temperature: 22°C<br/>Fan mode: Auto</td></tr></table> | Cooling                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Set temperature: 28°C<br>Fan mode: Auto | Dehumidifying                | Set temperature: Room temperature at operation start | Heating                                                                                    | Fan mode: Auto<br>Set temperature: 22°C<br>Fan mode: Auto |                                                                              |
| Cooling                                   | Set temperature: 28°C<br>Fan mode: Auto                                                                    |                                                                                                                                                                                                                             |                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                         |                              |                                                      |                                                                                            |                                                           |                                                                              |
| Dehumidifying                             | Set temperature: Room temperature at operation start                                                       |                                                                                                                                                                                                                             |                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                         |                              |                                                      |                                                                                            |                                                           |                                                                              |
| Heating                                   | Fan mode: Auto<br>Set temperature: 22°C<br>Fan mode: Auto                                                  |                                                                                                                                                                                                                             |                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                         |                              |                                                      |                                                                                            |                                                           |                                                                              |
| Sleep operation (with sleep button ON)    | Enters sleep operation after set as on the left.<br>Action during sleep operation silent (sleep) operation | · Same as at left.<br>· See page 130.                                                                                                                                                                                       | · Same as at left.<br>· See page 133.                                                                                                                                                              | · Same as at left.<br>· See page 140.                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | · Same as at left.<br>· Performs the sleep operation of each operation mode.                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                         |                              |                                                      |                                                                                            |                                                           |                                                                              |

- Notes:
- The speed set of rotaion for the fan motor in each operation mode are as shown in Table 1.
  - The set room temperatures in the diagram include the shift values in Table 2.
  - See "Damper control theory" for damper control and upper / lower fan operations.

Table 1 Fan speed by mode

| N O. | MODEL     | RAF-25NH4<br>REQUIRED VALUE<br>OF UNIT SIDE | RAF-50NH4<br>REQUIRED VALUE<br>OF UNIT SIDE |
|------|-----------|---------------------------------------------|---------------------------------------------|
| 120  | WMAX_M    | 5300 min-1                                  | 4500 min-1                                  |
| 121  | WMAX2_M   | 5300 min-1                                  | 4500 min-1                                  |
| 122  | WSTD_M    | 4000 min-1                                  | 4000 min-1                                  |
| 123  | WJKMAX_M  | 3700 min-1                                  | 4000 min-1                                  |
| 124  | WBEMAX_M  | 3500 min-1                                  | 3700 min-1                                  |
| 125  | CMAX_M    | 3500 min-1                                  | 4000 min-1                                  |
| 126  | CMAX2_M   | 3500 min-1                                  | 4000 min-1                                  |
| 127  | CSTD_M    | 3250 min-1                                  | 3100 min-1                                  |
| 128  | CKYMAX_M  | 2800 min-1                                  | 2800 min-1                                  |
| 129  | CJKMAX_M  | 2750 min-1                                  | 2750 min-1                                  |
| 12A  | CBEMAX_M  | 2500 min-1                                  | 2500 min-1                                  |
| 12B  | SDMAX_M   | 2400 min-1                                  | 1800 min-1                                  |
| 12C  | SDRPM_M   | 2000 min-1                                  | 1100 min-1                                  |
| 132  | WMIN_M    | 800 min-1                                   | 800 min-1                                   |
| 133  | CMINHI_M  | 800 min-1                                   | 800 min-1                                   |
| 134  | CMIN_M    | 1200 min-1                                  | 1200 min-1                                  |
| 135  | DMIN_M    | 1200 min-1                                  | 1100 min-1                                  |
| 136  | PKOU_M    | 500 min-1                                   | 500 min-1                                   |
| 137  | FZZY_GN_M | 1.0                                         | 1.0                                         |
| 138  | FZZYTM_M  | 3 min.                                      | 3 min.                                      |
| 13E  | SHIFTW    | 3.33 °C                                     | 3.33 °C                                     |
| 13F  | SFTSZW    | 1.66 °C                                     | 1.66 °C                                     |
| 140  | SHIFTC    | 1.00 °C                                     | 1.00 °C                                     |
| 141  | SHIFTD    | 1.00 °C                                     | 1.00 °C                                     |
| 142  | CLMXTM_M  | 30.00 °C                                    | 30.00 °C                                    |
| 143  | YNEOF_M   | 23.00 °C                                    | 23.00 °C                                    |
| 148  | TEION_M   | 2.00 °C                                     | 2.00 °C                                     |
| 149  | TEIOF_M   | 9.00 °C                                     | 9.00 °C                                     |
| 150  | CMNLMT_M  | 1900 min-1                                  | 1900 min-1                                  |
| 16D  | FWSS_M    | 400 min-1                                   | 400 min-1                                   |
| 16E  | FWSOY_M   | 710 min-1                                   | 820 min-1                                   |
| 16F  | FWS_M     | 710 min-1                                   | 820 min-1                                   |
| 170  | FWKAF_M   | 790 min-1                                   | 950 min-1                                   |
| 171  | FWL_M     | 790 min-1                                   | 950 min-1                                   |
| 172  | FWAH_M    | 830 min-1                                   | 1040 min-1                                  |
| 173  | FWH_M     | 870 min-1                                   | 1080 min-1                                  |
| 174  | FWHM_M    | 960 min-1                                   | 1170 min-1                                  |
| 175  | FWHH_M    | 960 min-1                                   | 1250 min-1                                  |
| 176  | FCSOY_M   | 670 min-1                                   | 670 min-1                                   |
| 177  | FCS_M     | 670 min-1                                   | 730 min-1                                   |
| 178  | FCL_M     | 750 min-1                                   | 920 min-1                                   |
| 179  | FCAH_M    | 790 min-1                                   | 1000 min-1                                  |
| 17A  | FCH_M     | 830 min-1                                   | 1050 min-1                                  |
| 17B  | FCHM_M    | 880 min-1                                   | 1090 min-1                                  |
| 17C  | FCHH_M    | 880 min-1                                   | 1090 min-1                                  |
| 17D  | FDOY_M    | 670 min-1                                   | 730 min-1                                   |
| 17E  | FDS1_M    | 670 min-1                                   | 730 min-1                                   |
| 17F  | FDS2_M    | 670 min-1                                   | 730 min-1                                   |
| 180  | FCLN_M    | 600 min-1                                   | 600 min-1                                   |
| 186  | FWOPN_M   | 1060 min-1                                  | 1250 min-1                                  |
| 187  | FCOPN_M   | 1020 min-1                                  | 1090 min-1                                  |
| 188  | FWCLD_M   | 1060 min-1                                  | 1250 min-1                                  |
| 189  | FCCLD_M   | 1020 min-1                                  | 1090 min-1                                  |
| 18A  | FWUDSS_M  | 400 min-1                                   | 400 min-1                                   |
| 18B  | FWUDSOY_M | 640 min-1                                   | 740 min-1                                   |
| 18C  | FWUDS_M   | 640 min-1                                   | 740 min-1                                   |
| 18D  | FWUDKAF_M | 710 min-1                                   | 860 min-1                                   |
| 18E  | FWUDL_M   | 710 min-1                                   | 860 min-1                                   |
| 18F  | FWUDAH_M  | 750 min-1                                   | 950 min-1                                   |
| 190  | FWUDH_M   | 780 min-1                                   | 970 min-1                                   |
| 191  | FWUDHH_M  | 870 min-1                                   | 1100 min-1                                  |
| 192  | FCUDSOY_M | 600 min-1                                   | 660 min-1                                   |
| 193  | FCUDS_M   | 600 min-1                                   | 660 min-1                                   |
| 194  | FCUDL_M   | 680 min-1                                   | 820 min-1                                   |
| 195  | FCUDAH_M  | 710 min-1                                   | 900 min-1                                   |
| 196  | FCUDH_M   | 750 min-1                                   | 940 min-1                                   |
| 197  | FCUDHH_M  | 790 min-1                                   | 980 min-1                                   |
| 19D  | FWUDOPN_M | 950 min-1                                   | 1100 min-1                                  |
| 19E  | FCUDOPN_M | 900 min-1                                   | 980 min-1                                   |

| Operation mode          |                      | Fan speed mode                 |                                | Label name |
|-------------------------|----------------------|--------------------------------|--------------------------------|------------|
| Heating operation       | Upper Fan            | Ultra Lo                       |                                | FWSS       |
|                         |                      | Sleep                          |                                | FWSOY      |
|                         |                      | Lo                             |                                | FWS        |
|                         |                      | Overload                       |                                | FWKAF      |
|                         |                      | Med                            |                                | FWL        |
|                         |                      | Hi                             | Set fan speed "Hi"             | FWH        |
|                         |                      | Ultra Hi                       | (When AIR OUTLET SWITCH "ON")  | FWHM       |
|                         | Ultra Hi             | (When AIR OUTLET SWITCH "OFF") |                                | FWHH       |
|                         | Hi                   | Set fan speed "AUTO"           |                                | FWAH       |
|                         | Lower Fan            | Ultra Lo                       |                                | FWUDSS     |
|                         |                      | Sleep                          |                                | FWUDSOY    |
|                         |                      | Lo                             |                                | FWUDS      |
|                         |                      | Overload                       |                                | FWUDKAF    |
|                         |                      | Med                            |                                | FWUDL      |
| Hi                      |                      | Set fan speed "Hi"             | FWUDH                          |            |
| Ultra Hi                |                      |                                | FWUDHH                         |            |
| Hi                      | Set fan speed "AUTO" |                                | FWUDAH                         |            |
| Cooling operation       | Upper Fan            | Sleep                          |                                | FCSOY      |
|                         |                      | Lo                             |                                | FCS        |
|                         |                      | Med                            |                                | FCL        |
|                         |                      | H                              | Set fan speed "Hi"             | FCH        |
|                         |                      | Ultra Hi                       | (When AIR OUTLET SWITCH "ON")  | FCHM       |
|                         |                      | Ultra Hi                       | (When AIR OUTLET SWITCH "OFF") | FCHH       |
|                         |                      | H                              | Set fan speed "AUTO"           | FCAH       |
|                         | Lower Fan            | Sleep                          |                                | FCUDSOY    |
|                         |                      | Lo                             |                                | FCUDS      |
|                         |                      | Med                            |                                | FCUDL      |
|                         |                      | H                              | Set fan speed "Hi"             | FCUDH      |
|                         |                      | Ultra Hi                       |                                | FCUDHH     |
| Hi                      | Set fan speed "AUTO" |                                | FCUDAH                         |            |
| Dehumidifying operation |                      | Sleep                          |                                | FDOY       |
|                         |                      | Lo 1                           |                                | FDS1       |
|                         |                      | Lo 2                           |                                | FDS2       |

Table 2 Room temperature shift value

| Table 2: Room temperature shift value |                           | Shift value |
|---------------------------------------|---------------------------|-------------|
| Operation mode                        |                           |             |
| Heating operation                     | Fan speed "AUTO, Hi, Med" | SHIFTW      |
|                                       | Fan speed "Lo, Sleep"     | SFTSZW      |
| Cooling operation                     |                           | SHIFTC      |
| Dehumidifying operation               |                           | SHIFTD      |

| PROM NO. | LABEL NAME | RAD-25QH4                   | RAD-40QH4  |
|----------|------------|-----------------------------|------------|
|          |            | REQUIRED VALUE OF UNIT SIDE |            |
| 0        | WMAX       | 5300 min-1                  | 4500 min-1 |
| 1        | WMAX2      | 5300 min-1                  | 4500 min-1 |
| 2        | WSTD       | 4000 min-1                  | 4000 min-1 |
| 9        | CMAX       | 3300 min-1                  | 4000 min-1 |
| A        | CMAX2      | 3300 min-1                  | 4000 min-1 |
| B        | CSTD       | 3000 min-1                  | 3000 min-1 |
| 1B       | SDMAX      | 2050 min-1                  | 1800 min-1 |
| 1C       | SDRPM      | 1800 min-1                  | 1500 min-1 |
| 2B       | PKOU       | 500 min-1                   | 500 min-1  |
| 41       | SHIFTW     | 5.00 °C                     | 5.00 °C    |
| 42       | SFTSZW     | 5.00 °C                     | 5.00 °C    |
| 43       | SHIFTC     | 1.66 °C                     | 1.66 °C    |
| 44       | SHIFTD     | 1.66 °C                     | 1.66 °C    |
| A3       | AFWSS      | 13.0 V                      | 13.0 V     |
| A4       | AFWSOY     | 17.6 V                      | 17.6 V     |
| A5       | AFWS       | 20.3 V                      | 20.3 V     |
| A6       | AFWKAF     | 22.8 V                      | 22.8 V     |
| A7       | AFWL       | 22.8 V                      | 22.8 V     |
| A8       | AFWAH      | 28.0 V                      | 28.0 V     |
| A9       | AFWH       | 28.4 V                      | 28.4 V     |
| AA       | AFWHH      | 28.4 V                      | 28.4 V     |
| AB       | AFCSOY     | 17.9 V                      | 17.9 V     |
| AC       | AFCS       | 20.5 V                      | 20.5 V     |
| AD       | AFCL       | 24.0 V                      | 24.0 V     |
| AE       | AFCAH      | 28.0 V                      | 28.0 V     |
| AF       | AFCH       | 28.0 V                      | 28.0 V     |
| B0       | AFCHH      | 28.0 V                      | 28.0 V     |
| B5       | AFDOY      | 17.9 V                      | 17.9 V     |
| B6       | AFDS1      | 20.5 V                      | 20.5 V     |
| B7       | AFDS2      | 20.5 V                      | 20.5 V     |

Table 1 Fan speed by mode

| Operation mode          |          | Fan speed mode       | Label name |
|-------------------------|----------|----------------------|------------|
| Heating Operation       | Ultra Lo |                      | AFWSS      |
|                         | Sleep    |                      | AFWSOY     |
|                         | Lo       |                      | AFWS       |
|                         | Overload |                      | AFWKAF     |
|                         | Med      |                      | AFWL       |
|                         | Hi       | Set fan speed "AUTO" | AFWAH      |
|                         |          | Set fan speed "Hi"   | AFWH       |
|                         | Ultra Hi |                      | AFWHH      |
| Cooling Operation       | Sleep    |                      | AFCSOY     |
|                         | Lo       |                      | AFCS       |
|                         | Med      |                      | AFCL       |
|                         | Hi       | Set fan speed "AUTO" | AFCAH      |
|                         |          | Set fan speed "Hi"   | AFCH       |
|                         | Ultra Hi |                      | AFCHH      |
| Dehumidifying operation | Sleep    |                      | AFDOY      |
|                         | Lo 1     |                      | AFDS1      |
|                         | Lo 2     |                      | AFDS2      |

Table 2 Room temperature shift value

| Operation mode          |                         | Shift value |
|-------------------------|-------------------------|-------------|
| Heating operation       | Fan speed "AUTO,Hi,Med" | SHIFTW      |
|                         | Fan speed "Lo,Sleep"    | SFTSZW      |
| Cooling operation       |                         | SHIFTC      |
| Dehumidifying operation |                         | SHIFTD      |

| M O D E                                             |                                                                        |                                                                       |                                                                     |                                             | N O .                      | LABEL NAME  | REQUIRED VALUE OF UNIT SIDE |       |       |
|-----------------------------------------------------|------------------------------------------------------------------------|-----------------------------------------------------------------------|---------------------------------------------------------------------|---------------------------------------------|----------------------------|-------------|-----------------------------|-------|-------|
| ELECTRIC EXPANSION VALVE                            | The degree of valve difference at the time of starting                 | COOLING OPERATION                                                     | 1 unit operation                                                    | Outdoor temperature of less than 40℃        | 080H                       | PSTARTC1\$  | 250                         |       |       |
|                                                     |                                                                        |                                                                       |                                                                     | Outdoor temperature of 40℃ or more          | 081H                       | PSTARTC1K\$ | 300                         |       |       |
|                                                     |                                                                        |                                                                       | 2 unit operation                                                    | Outdoor temperature of less than 40℃        | 082H                       | PSTARTC2\$  | 150                         |       |       |
|                                                     |                                                                        |                                                                       |                                                                     | Outdoor temperature of 40℃ or more          | 083H                       | PSTARTC2K\$ | 200                         |       |       |
|                                                     |                                                                        | HEATING OPERATION                                                     | Common                                                              | Except the indoor setting wind velocity LOW | 084H                       | PSTARTH\$   | 180                         |       |       |
|                                                     |                                                                        |                                                                       |                                                                     | Indoor setting wind velocity LOW            | 085H                       | PSTARTH2\$  | 100                         |       |       |
|                                                     | The degree of minimum valve difference                                 |                                                                       |                                                                     |                                             | 086H                       | PMIN\$      | 30                          |       |       |
|                                                     | Reverse cycle period                                                   | The digree of initial valve difference                                | Normal                                                              |                                             | 087H                       | DFCTPS\$    | 100                         |       |       |
|                                                     |                                                                        |                                                                       | Step up                                                             |                                             | 089H                       | DFSPPS\$    | 380                         |       |       |
|                                                     |                                                                        |                                                                       | The degree of last attainment valve difference                      |                                             | 08AH                       | DFPSMX\$    | 480                         |       |       |
|                                                     |                                                                        |                                                                       | The digree of valve difference by the stop side refrigerating cycle |                                             | 08BH                       | PCLOCH\$    | 30                          |       |       |
|                                                     |                                                                        |                                                                       | A part for the narrow pipe of the stop cycle side temperature rise  |                                             | 08CH                       | HOSO_SA     | 3.00                        |       |       |
| Compensa-tion △                                     | COOLING OPERATION                                                      |                                                                       |                                                                     | 08DH                                        | dN_e_C                     | 50          |                             |       |       |
|                                                     | HEATING OPERATION                                                      |                                                                       |                                                                     | 08EH                                        | dN_e_H                     | 80          |                             |       |       |
| Compressor rotation speed maximum and minimum value | « Cooling »                                                            | SINGLE COMPRESSOR OPERATION                                           | One unit operation                                                  |                                             | 0C0H                       | CMAX_1C1D   | 5200                        | min-1 |       |
|                                                     |                                                                        |                                                                       | Two unit operation (Those with 2kw model connection)                |                                             | 0C1H                       | CMAX_1C2D1  | 5200                        | min-1 |       |
|                                                     |                                                                        |                                                                       | Two unit operation                                                  |                                             | 0C2H                       | CMAX_1C2D2  | 5500                        | min-1 |       |
|                                                     |                                                                        | TWO COMPRESSOR OPERATION                                              | One unit operation                                                  |                                             | 0C3H                       | CMAX_2C1D   | 4000                        | min-1 |       |
|                                                     |                                                                        |                                                                       | Two unit operation (Those with 2kw model connection)                |                                             | 0C4H                       | CMAX_2C2D1  | 4500                        | min-1 |       |
|                                                     |                                                                        |                                                                       | Two unit operation                                                  |                                             | 0C5H                       | CMAX_2C2D2  | 5000                        | min-1 |       |
|                                                     | « HEATING »                                                            | SINGLE COMPRESSOR OPERATION                                           | One unit operation                                                  |                                             | 0C6H                       | WMAX_1C1D   | 5800                        | min-1 |       |
|                                                     |                                                                        |                                                                       | Two unit operation (Those with 2kw model connection)                |                                             | 0C7H                       | WMAX_1C2D1  | 6500                        | min-1 |       |
|                                                     |                                                                        |                                                                       | Two unit operation                                                  |                                             | 0C8H                       | WMAX_1C2D2  | 6500                        | min-1 |       |
|                                                     |                                                                        | TWO COMPRESSOR OPERATION                                              | One unit operation                                                  |                                             | 0C9H                       | WMAX_2C1D   | 5000                        | min-1 |       |
|                                                     |                                                                        |                                                                       | Two unit operation (Those with 2kw model connection)                |                                             | 0CAH                       | WMAX_2C2D1  | 6500                        | min-1 |       |
|                                                     |                                                                        |                                                                       | Two unit operation                                                  |                                             | 0CBH                       | WMAX_2C2D2  | 6500                        | min-1 |       |
|                                                     | Max at the time of the following of the setting wind velocity is Lo    | Normal                                                                | Cooling                                                             |                                             | 0CCH                       | CJKMAX      | 5000                        | min-1 |       |
|                                                     |                                                                        |                                                                       | Heating                                                             |                                             | 0CDH                       | WJKMAX      | 6500                        | min-1 |       |
|                                                     | One unit heating operation outdoor temp. ≦ max rotation speed at the5℃ |                                                                       |                                                                     | 3.6 kw or less                              |                            | 0D0H        | GAIMX1                      | 5650  | min-1 |
|                                                     |                                                                        |                                                                       |                                                                     | 4.0 kw or more                              |                            | 0D1H        | GAIMX2                      | 5800  | min-1 |
|                                                     |                                                                        | Minimum rotation speed                                                |                                                                     |                                             | Cooling                    |             | 0D2H                        | CMIN  | 1400  |
|                                                     | Heating                                                                |                                                                       |                                                                     |                                             | 0D3H                       | WMIN        | 1400                        | min-1 |       |
|                                                     | Rversing valve control                                                 | Power ON/OFF at the compressor rotation speed                         |                                                                     | O N                                         | Normal                     | 120H        | BONRPM_S                    | 1500  | min-1 |
|                                                     |                                                                        |                                                                       |                                                                     | O F F                                       | Velocity Continuation time | 122H        | BOFRPM                      | 1600  | min-1 |
| Power on at the time of a compressor slowdown       |                                                                        | Forced ON time                                                        |                                                                     | 123H                                        | BONTMB                     | 180         | sec.                        |       |       |
|                                                     |                                                                        | Compressorcommand rotations spee is down deviation                    |                                                                     | 124H                                        | SBNTIM                     | 10          | min.                        |       |       |
| Power ON by the outdoor temperature                 |                                                                        |                                                                       |                                                                     | 125H                                        | SIREISA                    | 300         | min-1                       |       |       |
| Compressor starting sequence                        | Compressor rotation speed at the during Forced cooling operation       |                                                                       |                                                                     |                                             | 126H                       | SBCTGT      | 34                          | ℃     |       |
|                                                     | At starting of cooling operation cycle                                 | outdoor temperature judging value                                     |                                                                     |                                             | 128H                       | KYO_RPM     | 4000                        | min-1 |       |
|                                                     |                                                                        | outdoor temperature > STAROTP_C                                       | initial rotation speed                                              |                                             | 129H                       | STAROTP_C   | 25.0                        | ℃     |       |
|                                                     |                                                                        |                                                                       | initial drive time                                                  |                                             | 12AH                       | SDRCT1_C1   | 2000                        | min-1 |       |
|                                                     |                                                                        |                                                                       | initial rotation speed                                              |                                             | 12BH                       | TSKTM1_C1   | 60                          | sec.  |       |
|                                                     |                                                                        |                                                                       | initial rotation speed                                              |                                             | 12CH                       | SDRCT1_C2   | 3000                        | min-1 |       |
|                                                     |                                                                        |                                                                       | initial drive time                                                  |                                             | 12DH                       | TSKTM1_C2   | 60                          | sec.  |       |
|                                                     | At starting of heating operation cycle                                 | outdoor temperature judging value                                     |                                                                     |                                             | 12EH                       | STAROTP_W   | 4.8                         | ℃     |       |
|                                                     |                                                                        | outdoor temperature > STAROTP_W                                       | initial rotation speed                                              |                                             | 12FH                       | SDRCT1_W1   | 2000                        | min-1 |       |
|                                                     |                                                                        |                                                                       | initial drive time                                                  |                                             | 12BH                       | TSKTM2      | 60                          | sec.  |       |
|                                                     |                                                                        |                                                                       | initial rotation speed                                              |                                             | 130H                       | TSKTM1_W1   | 60                          | sec.  |       |
|                                                     |                                                                        |                                                                       | initial rotation speed                                              |                                             | 131H                       | SDRCT1_W2   | 3000                        | min-1 |       |
|                                                     |                                                                        |                                                                       | initial drive time                                                  |                                             | 132H                       | TSKTM1_W2   | 120                         | sec.  |       |
| Step-up control                                     | Step-up rotation speed                                                 |                                                                       |                                                                     | 133H                                        | SDSTEP                     | 1000        | min-1                       |       |       |
|                                                     | Step-up cycle                                                          |                                                                       |                                                                     | 134H                                        | TSKSPT                     | 8           | sec.                        |       |       |
| Defrost control                                     | Slowdown period paramete                                               | Slowdown period 1                                                     |                                                                     |                                             | 135H                       | TDF411      | 0                           | sec.  |       |
|                                                     |                                                                        | Slowdown period 2                                                     |                                                                     |                                             | 136H                       | TDF412      | 0                           | sec.  |       |
|                                                     |                                                                        | Slowdown period 3                                                     |                                                                     |                                             | 137H                       | TDF413      | 0                           | sec.  |       |
|                                                     | Balance time before a reverse cycle start                              |                                                                       |                                                                     |                                             | 138H                       | TDF414      | 90                          | sec.  |       |
|                                                     | The parameter in a reverse cycle period                                | Maximum execution time                                                |                                                                     |                                             | 139H                       | DFMXTM      | 12                          | min.  |       |
|                                                     |                                                                        | At starting                                                           | initial rotation speed                                              |                                             | 13AH                       | SDRCT2      | 2000                        | min-1 |       |
|                                                     |                                                                        |                                                                       | initial drive time                                                  |                                             | 13BH                       | TSKTM2      | 60                          | sec.  |       |
|                                                     |                                                                        | Step-up                                                               | Step-up rotation speed                                              |                                             | 13CH                       | DFSTEP      | 1000                        | min-1 |       |
|                                                     |                                                                        |                                                                       | Step-up cycle                                                       |                                             | 13DH                       | TDFSPT      | 90                          | sec.  |       |
|                                                     |                                                                        | Maximum rotation speed                                                |                                                                     |                                             | 13EH                       | DEFMAX      | 6000                        | min-1 |       |
|                                                     | Balance time after a reverse cycle ended                               |                                                                       |                                                                     |                                             | 13FH                       | TDF415      | 90                          | sec.  |       |
|                                                     | Defrost prohibition period                                             | 0℃ or more of outdoor temperature                                     |                                                                     |                                             | 140H                       | DFSTMB      | 50                          | min.  |       |
|                                                     |                                                                        | -5℃ or less of outdoor temperature                                    |                                                                     |                                             | 141H                       | DFSTMB2     | 88                          | min.  |       |
|                                                     | Defrost demand start /release                                          | Start heat exchanger temperature                                      | Maximum                                                             |                                             | 142H                       | DEFONH      | -1.9                        | ℃     |       |
|                                                     |                                                                        |                                                                       | Standard                                                            |                                             | 143H                       | DEFON       | -5.1                        | ℃     |       |
|                                                     |                                                                        |                                                                       | Minimum                                                             |                                             | 144H                       | DEFONL      | -23.9                       | ℃     |       |
|                                                     |                                                                        |                                                                       | Compensation coefficient                                            | -3℃ or more of outdoor temperature          |                            | 145H        | DEF_a1                      | 112   | /128  |
| Less than -3℃ of outdoor temperature                |                                                                        | 146H                                                                  |                                                                     | DEF_a2                                      | 138                        | /128        |                             |       |       |
| Defrost release                                     |                                                                        |                                                                       | 147H                                                                | DEFOFF                                      | 15.0                       | ℃           |                             |       |       |
| Protection control                                  |                                                                        | Compressor rotation speed at the overheat thermistor high temperature |                                                                     | Down start overheat thermistor temperature  |                            | 148H        | NDWN_ON                     | 97.2  | ℃     |
|                                                     | Down release overheat thermistor temperature                           |                                                                       |                                                                     | 149H                                        | NDWN_OFF                   | 95.0        | ℃                           |       |       |
|                                                     | Stop by overheat                                                       | Start temperature                                                     |                                                                     |                                             | 14AH                       | OH_ON       | 118.2                       | ℃     |       |
| Release temperature                                 |                                                                        |                                                                       | 14BH                                                                | OH_OFF                                      | 104.7                      | ℃           |                             |       |       |



Basic Cooling Operation

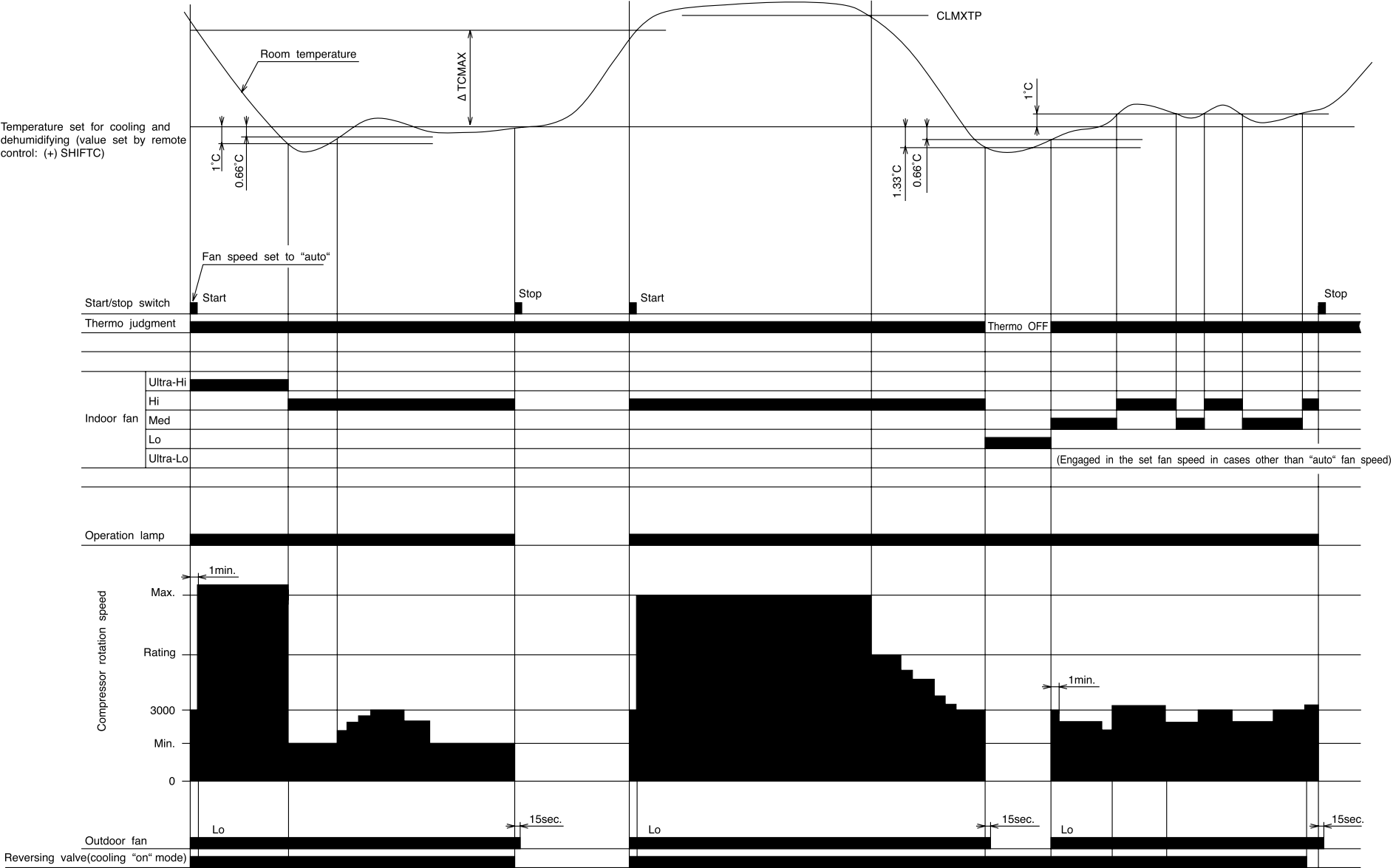


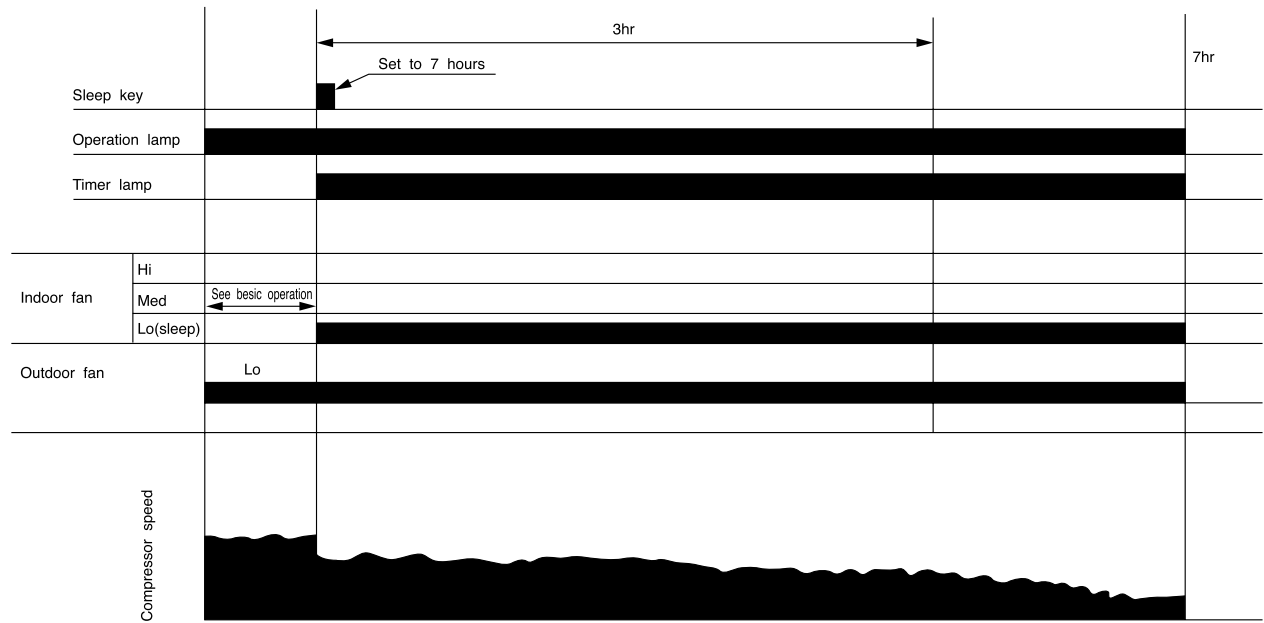
Table 1  $\Delta T_{CMAX}$

| Maximum speed<br>-minimum speed | Room<br>temperature-set<br>tempereture<br>(including shift) |
|---------------------------------|-------------------------------------------------------------|
| 1400min <sup>-1</sup>           | 2.00°C                                                      |
| 1800min <sup>-1</sup>           | 2.33°C                                                      |
| 2200min <sup>-1</sup>           | 2.66°C                                                      |
| 2600min <sup>-1</sup>           | 3.00°C                                                      |
| 3000min <sup>-1</sup>           | 3.33°C                                                      |
| 3400min <sup>-1</sup>           | 3.66°C                                                      |
| 3800min <sup>-1</sup>           | 4.00°C                                                      |
| 4200min <sup>-1</sup>           | 4.33°C                                                      |
| 4600min <sup>-1</sup>           | 4.66°C                                                      |
| 5000min <sup>-1</sup>           | 5.00°C                                                      |
| 5400min <sup>-1</sup>           | 5.33°C                                                      |
| 5800min <sup>-1</sup>           | 5.66°C                                                      |
| 6200min <sup>-1</sup>           | 6.00°C                                                      |
| 6600min <sup>-1</sup>           | 6.33°C                                                      |
| 7000min <sup>-1</sup>           | 6.66°C                                                      |

Note:  
1. See the data on page 118, 120, 123 for each constant  
in capital letters in the diagrams.

Notes:  
(1) The comprassor minimum ON time and minimum OFF time is 3minutes.  
(2) See "Damper control theory" for dampar control and upper / lower fan operations.

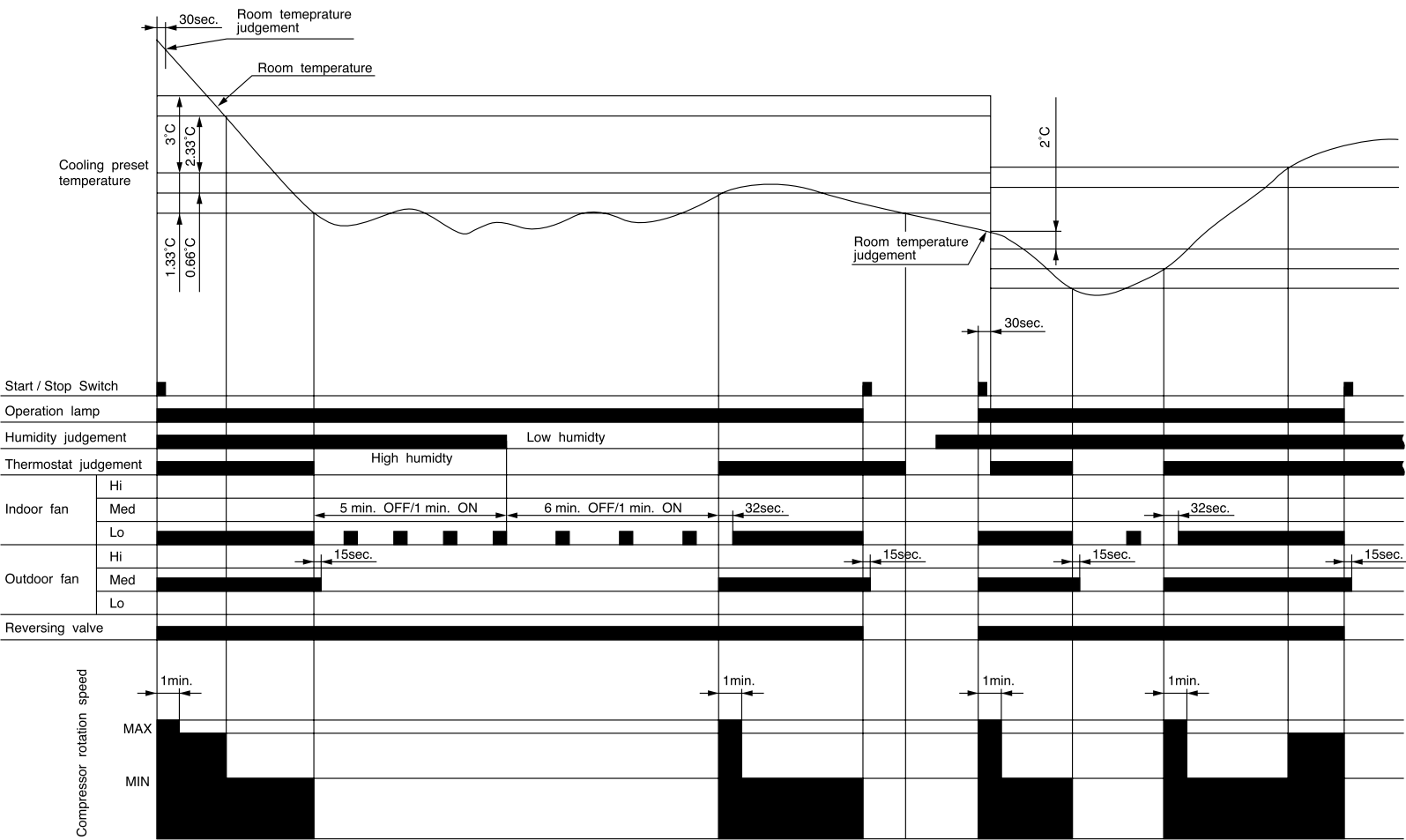
## Cooling Sleep Operation



### Notes:

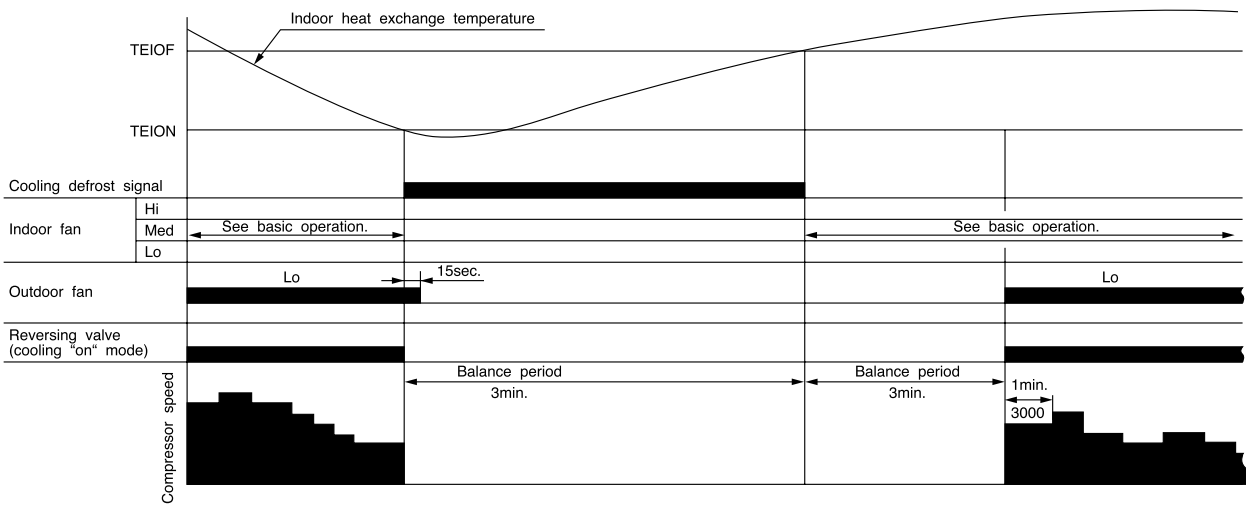
- (1) The sleep operation starts when the sleep key is pressed.
- (2) If the operation mode is changed during sleep operation, the set temperature is cleared, and shift starts from the point when switching is made.
- (3) The indoor fan speed does not change even when the fan speed mode is changed.
- (4) When operation is stopped during sleep operation, the set temperature when stopped, as well as the time, continue to be counted.
- (5) If the set time is changed during sleep operation, all data including set temperature, time, etc. is cleared and restarted.
- (6) If sleep operation is canceled by the cancel key or sleep key, all data is cleared.

Dehumidifying



- Notes:
- (1) 30 seconds after the operation is started, when the room temperature is (cooling preset temperature) - (1.33°C) or less, the operation is done assuming as the preset temperature = (room temperature at the time) - (2°C).
  - (2) The indoor fan is operated in the "Lo" mode, OFF for 5 minutes and ON for 1 minute (at high humidity) or OFF for 6 minutes and ON for 1 minute (at low humidity), repeatedly according to the humidity judgement when the thermostat is turned OFF.
  - (3) When the operation is started by thee thermostat turning ON, the start of the indoor fan is delayed 32 seconds after the start of compressor operation.
  - (4) The commpressor is operated forcedly for 3 minutes after operation is started.
  - (5) The minimum ON time and OFF time of the compressor are 3 minutes.

Cooling Defrost



Basic Heating Operation

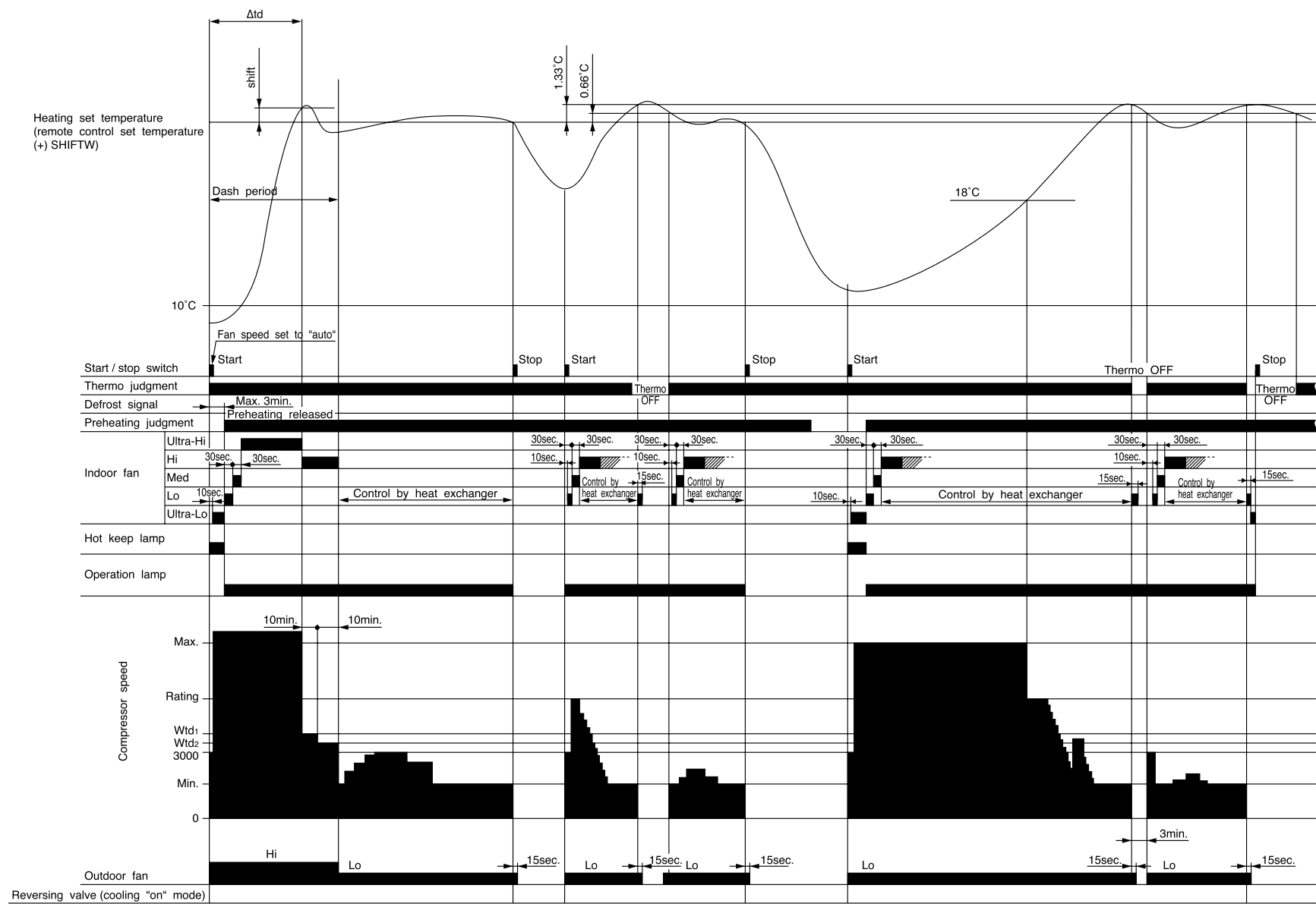


Table 6 Speed Specifications during Steady Speed Period.

| Δtd (Hot dash time)  | Wtd <sub>1</sub>      | Wtd <sub>2</sub>      |
|----------------------|-----------------------|-----------------------|
| Less than 10 minutes | 2000min <sup>-1</sup> | 1600min <sup>-1</sup> |
| 10 - 20 minutes      | 3000min <sup>-1</sup> | 2400min <sup>-1</sup> |
| 20 minutes or more   | 4000min <sup>-1</sup> | 3200min <sup>-1</sup> |

Table 7 ΔTWMAX

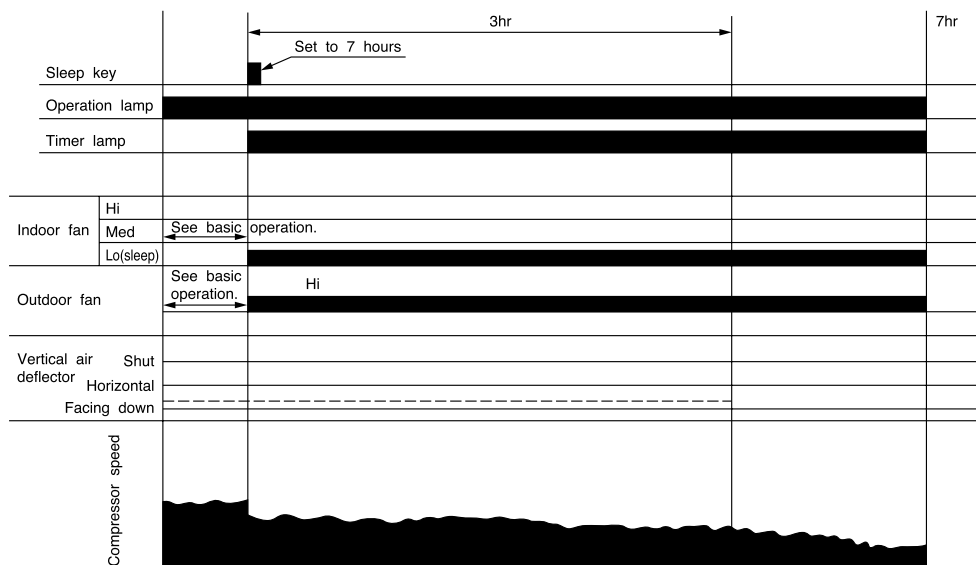
| Compressor speed - minimum speed | Set temperature (including shift)- room temperature |
|----------------------------------|-----------------------------------------------------|
| 1400min <sup>-1</sup>            | 2.00°C                                              |
| 1800min <sup>-1</sup>            | 2.33°C                                              |
| 2200min <sup>-1</sup>            | 2.66°C                                              |
| 2600min <sup>-1</sup>            | 3.00°C                                              |
| 3000min <sup>-1</sup>            | 3.33°C                                              |
| 3400min <sup>-1</sup>            | 3.66°C                                              |
| 3800min <sup>-1</sup>            | 4.00°C                                              |
| 4200min <sup>-1</sup>            | 4.33°C                                              |
| 4600min <sup>-1</sup>            | 4.66°C                                              |
| 5000min <sup>-1</sup>            | 5.00°C                                              |
| 5400min <sup>-1</sup>            | 5.33°C                                              |
| 5800min <sup>-1</sup>            | 5.66°C                                              |
| 6200min <sup>-1</sup>            | 6.00°C                                              |
| 6600min <sup>-1</sup>            | 6.33°C                                              |
| 7000min <sup>-1</sup>            | 6.66°C                                              |

- Notes:
- (1) Hot dash is engaged if the difference between the room temperature and set temperature is equal to that between the room temperature, at which the compressor reaches maximum speed, and set temperature (ΔTWMAX: See Table 7), and the room and outdoor temperatures are less than 10°C; when the fan speed is "auto", operation is started at "Hi", or the fan speed is changed to "Hi" during heating.
  - (2) The maximum compressor speed period during hot dash is finished (1) when the room temperature reaches the heating set temperature (including heating shift) when the thermo is off.
  - (3) The thermo OFF temperature during hot dash is heating set temperature (including heating shift) plus 3°C. After thermo OFF, hot dash finishes, and PI control starts with item 1 = 0.
  - (4) The compressor minimum ON time and minimum OFF time is 3 minutes.
  - (5) The time limit for which the maximum compressor speed during normal heating (except for hot dash) can be maintained is less than 120 minutes when the room temperature is 18°C or more; it is not provided when the room temperature is less than 18°C and outdoor temperature is less than 2°C.
  - (6) The operation indicator blinks every second during initial cycle operation, preheating, defrosting (including balance time after defrosting is finished), or auto fresh defrosting.
  - (7) If the room temperature falls to less than 18°C in the "ultra-Lo" mode, the indoor fan stops. When the room temperature is 18°C+0.33°C or more, the ultra-Lo operation restarts. However, the ultra-Lo operation during preheating or preheating after defrosting does not stop if the room temperature is less than 18°C.
  - (8) When thermostat is OFF ; after 3 minutes has elapsed operation with FAN set to ON for 15seconds and OFF for 60seconds will be repeated depending on heat exchange temperature.

Note:

1. See the data on page 118, 120, 123 for each constant in capital letters in the diagrams.

## Heating Sleep Operation



### Notes:

- (1) The sleep operation starts when the sleep key is pressed.
- (2) If the operation mode is changed during sleep operation, the changed operation mode is set and sleep control starts.
- (3) The indoor fan speed does not change even when the fan speed mode is changed. (Lo)
- (4) When defrosting is to be set during sleep operation, defrosting is engaged and sleep operation is restored after defrosting.
- (5) When operation is stopped during sleep operation, the set temperature when stopped, as well as the time, continue to be counted.
- (6) If the set time is changed during sleep operation, all data including set temperature, time, etc. is cleared and restarted.
- (7) If sleep operation is canceled by the cancel key or sleep key, all data is cleared.

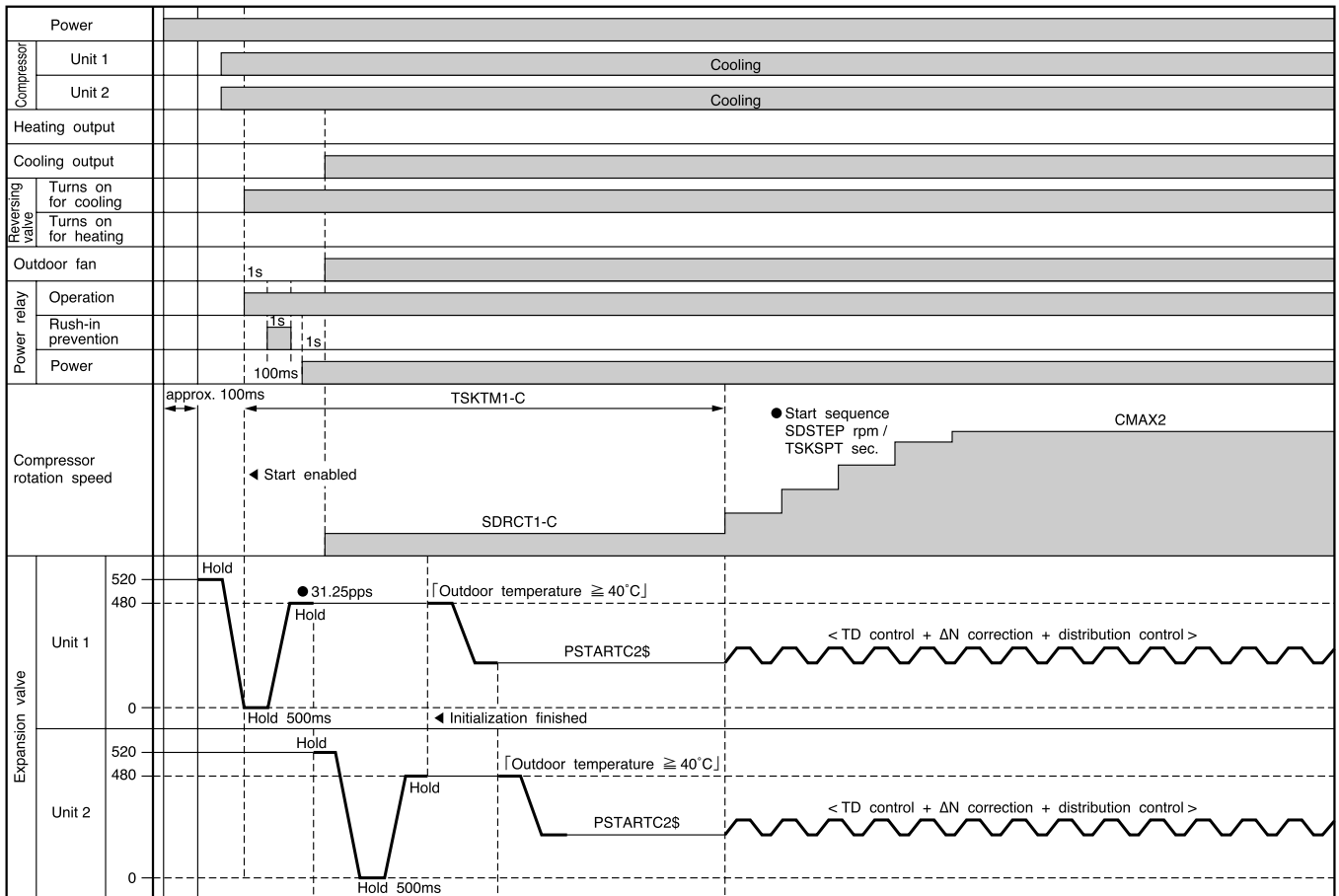
## MODEL RAM-70QH4 RAM-80QH4

### ◇ Expansion valves

- The expansion valves are initialized when power is supplied. The valve for unit 1 is fully closed (520 pulses), and then that for unit 2 is fully opened (480 pulses). When the valve for unit 1 is fully closed (0 pulse), start-up is possible.
- The start openings are held during the steady speed period when the compressor is started. After the steady speed period is finished, the TD control is entered. The start openings are set to PSTARTH when the outdoor temperature at start 40°C or more, and to PSTART when it is less than 40°C.

### ◇ Compressor rotation speed

- When the compressor is started, the SDRCT1 speed / TSKTM1 second is held.
- After the steady speed period is finished, the speed increases at the rate of SDSTEP speed / TSKSPT second until the target speed is reached.

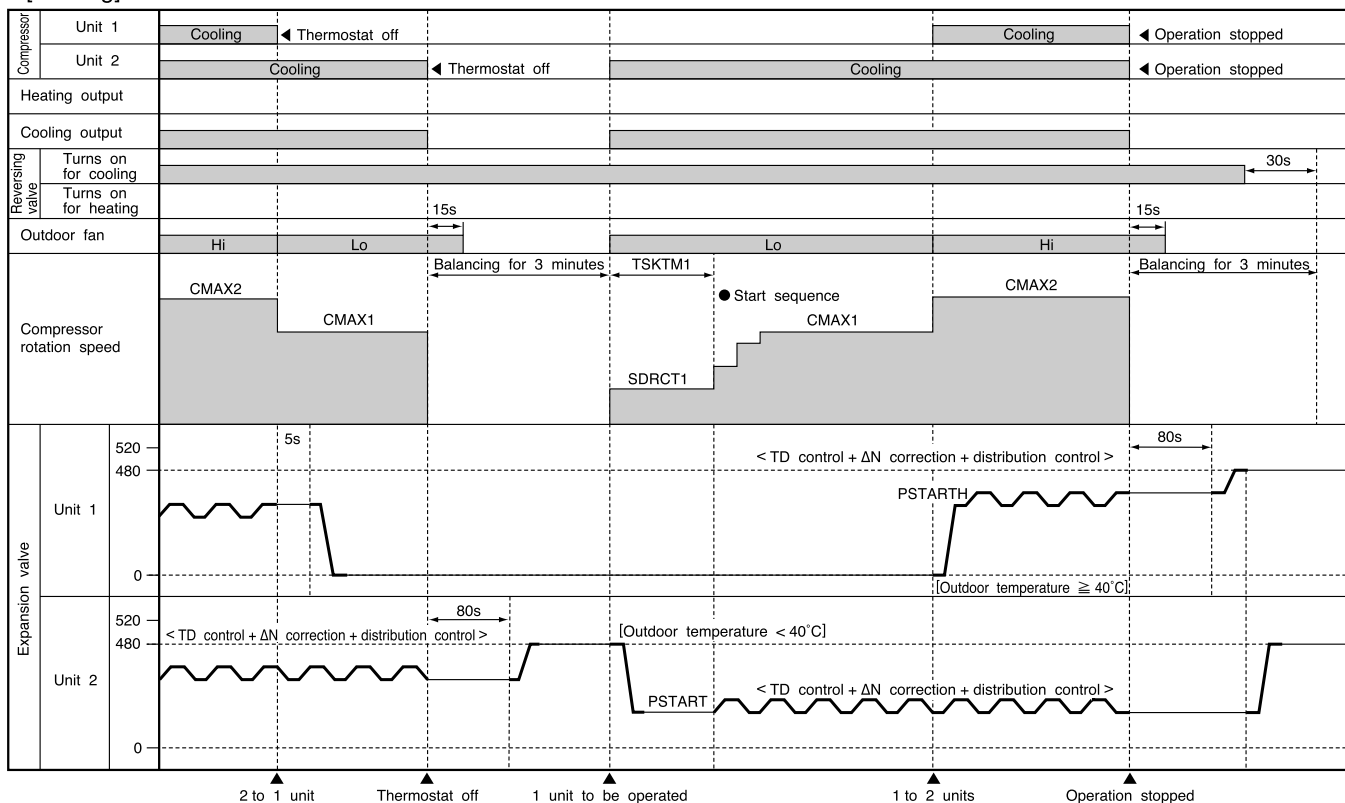


- ※ • See other sections for details of expansion valve TD control,  $\Delta N$  correction and distribution control.
- TSKTM1, SDRCT1, SDSTEP, TSKSPT, CMAX2, PSTART and PSTARTH are EEPROM data.
  - Unit 3 and 4 operation is the same as unit 1 and 2.
  - However, the outdoor unit fan is operated with the type A compressor.
  - With RAM-70QH4, type B compressor operates unit 3 only.

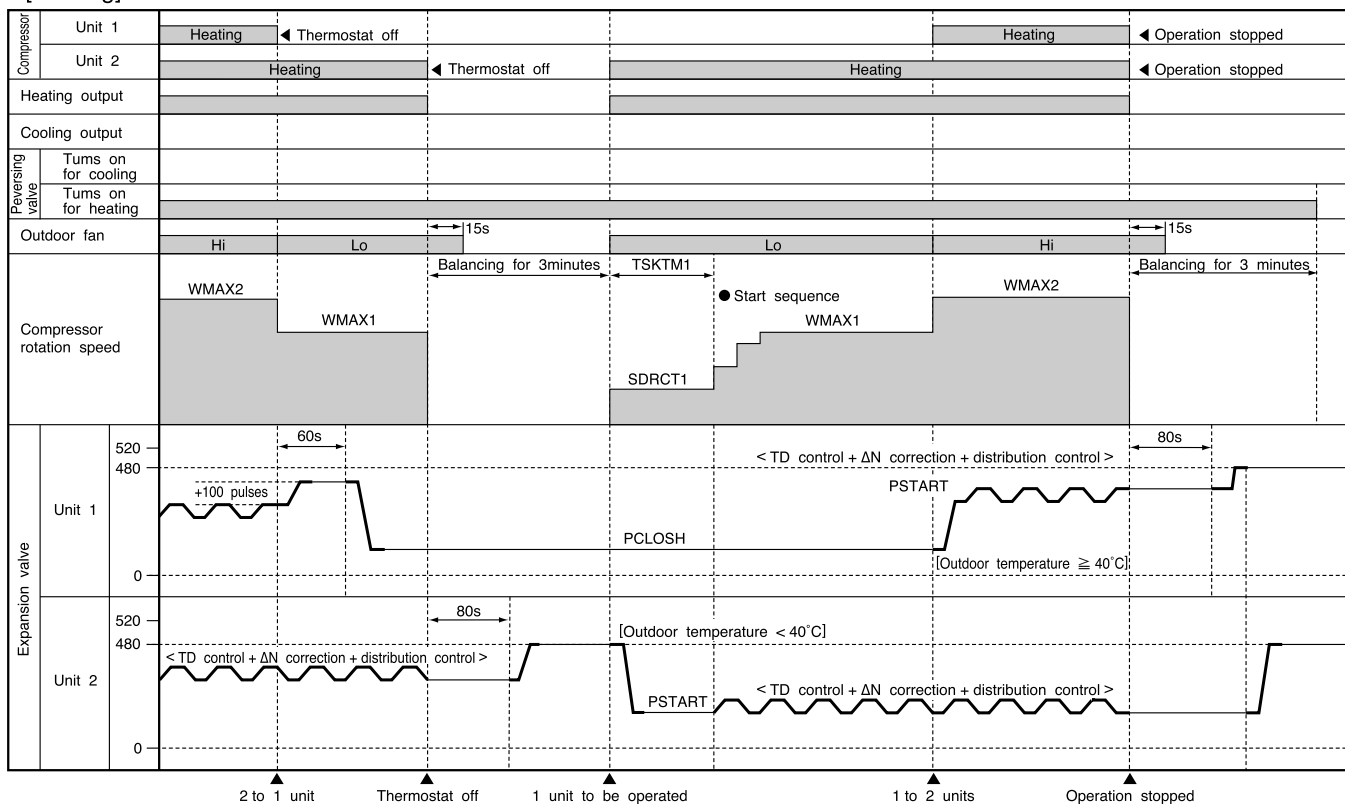
## CHANGING THE NUMBER OF UNITS TO BE OPERATED

- The following shows the operation status when the number of units to be operated is changed from 2 to 1, thermostat off, 1, 2 and then operation stop.

### [Cooling]



### [Heating]



- ※ See other sections for details of expansion valve TD control, ΔN correction and distribution control.
- CMAX1, CMAX2, WMAX1, WMAX2, TSKTM1, SDRCT1, PSTART, PSTARTH and PCLOSH are EEPROM data.

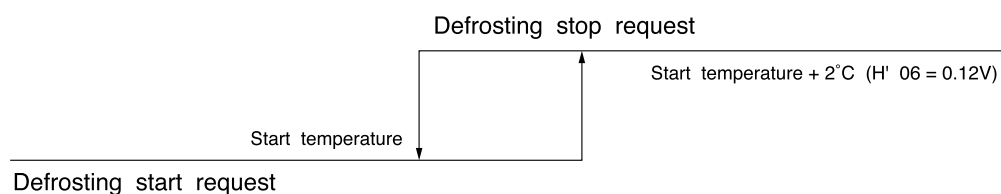
## << Defrosting Start / Release Request Judgment >>

- The microcomputer retrieves temperature data from the heat exchange sensor data; it senses that defrosting starts when the operation mode is heating (other than defrosting), and that defrosting stops when it is still defrosting.

Defrosting start temperature: DEF-ON (EEPROM)  
 Defrosting stop temperature: DEF-OFF (EEPROM)

### 1. Defection process diagram

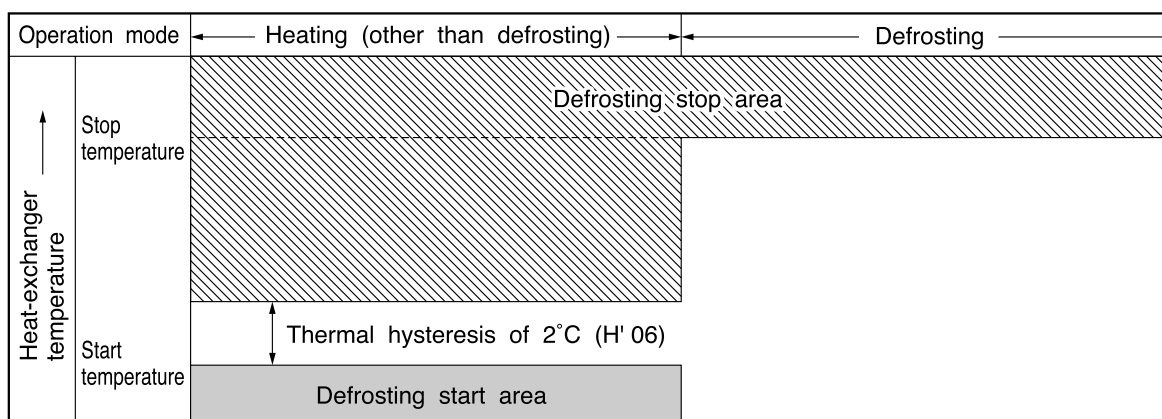
- During heating mode (other than defrosting)



- During defrosting mode



Note : Even if defrosting start request is issued, defrosting will not commence until the defrosting inhibit time (FLGSET : EEPROM) has passed after operation starts.

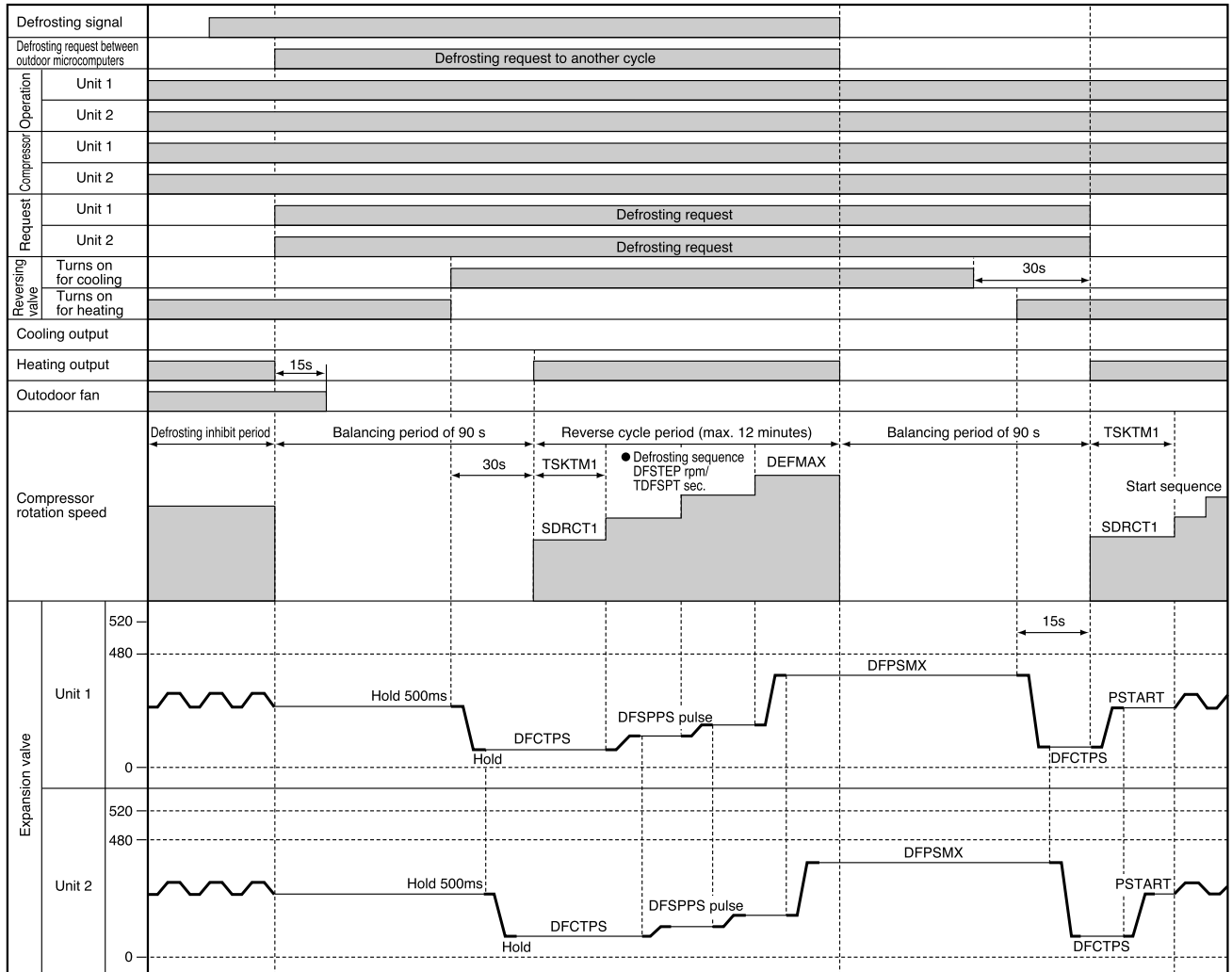




## DEFROSTING

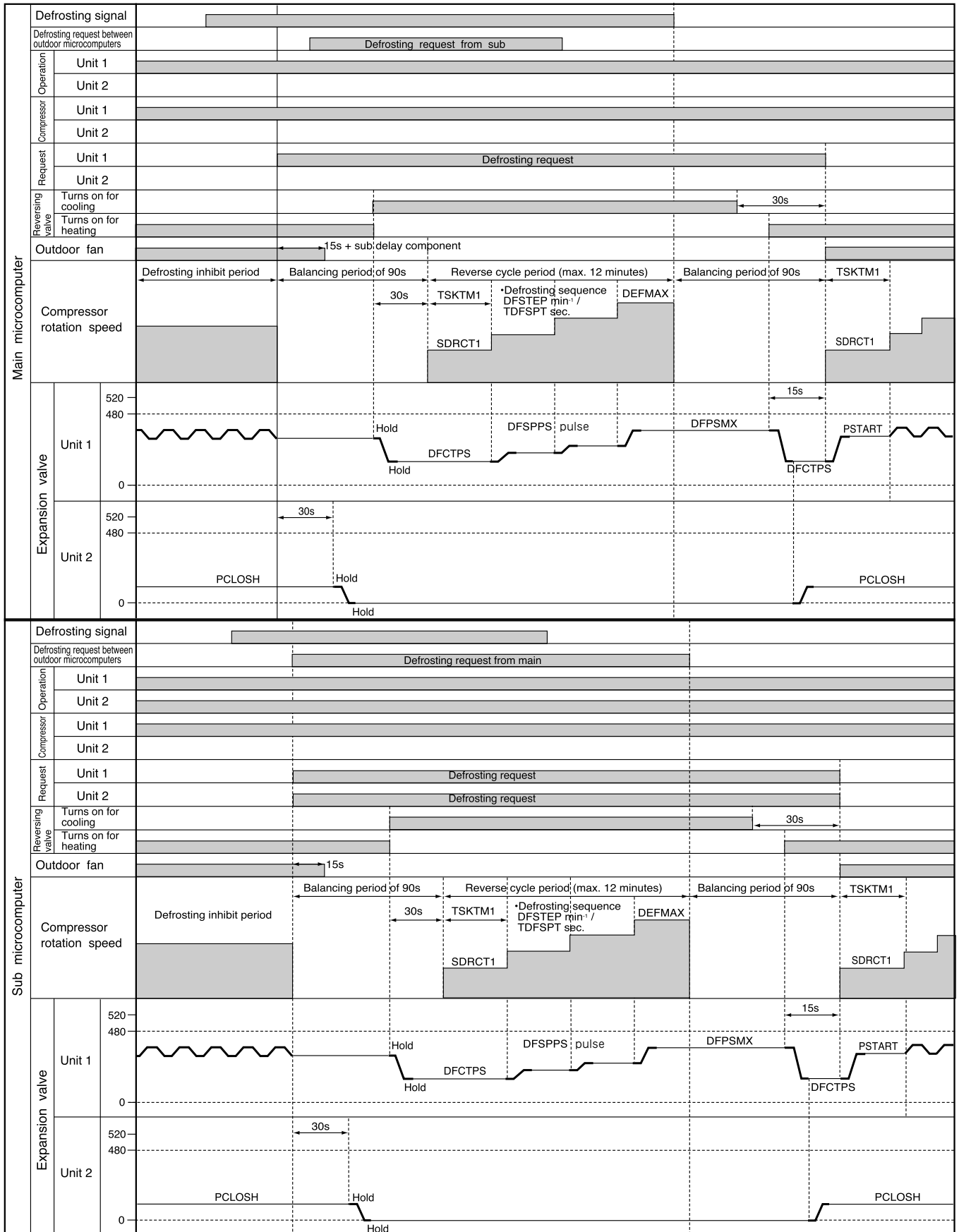
- A reversing valve defrosting format is used, and the defrosting cycle consists of [balancing period of 90 seconds when defrosting starts -> reverse cycle period for 12 minutes maximum -> balancing period of 90 seconds when defrosting stops]. Since this system uses the outdoor heat-exchanger concurrently in two cycles, defrosting is executed for both cycles during 2-cycle heating operation.
- (1) Defrosting start conditions
- Defrosting is performed when all the following conditions are satisfied (however, this does not apply when a defrosting request from another cycle is received.):
    - For normal operation
    - Heat-exchanger low temperature (heat-exchanger temperature  $\leq$  DEF.  $\Rightarrow$  ON)
    - When defrosting inhibit time is up (instructed by EEPROM [FLGSET (3.2.1)] and set when normal operation is started)
- (2) Defrosting stop conditions
- Defrosting is released when either of the following conditions is established (however, defrosting will continue when a defrosting request from another cycle is received.):
    - Heat-exchanger temperature is recovered (heat-exchanger temperature  $\geq$  DEF.  $\Rightarrow$  OFF)
    - When maximum defrosting time (12 minutes) is up
  - Release during balancing at start: To be returned to normal when remaining balancing time is up.
  - Release during reverse cycle period: To be returned to normal when balancing time (90 seconds) is up at the end.
- (3) Outputs during defrosting
- [Defrosting request between outdoor microcomputers] To be transferred only when heat-exchanger low temperature is detected and defrosting is being executed.
- [Indoor defrosting request] To be transferred to all units which are in heating operation.
- [Compressor] To increase the speed at the rate of DFSTEP rpm/TDFSPT second and reach the maximum defrosting speed [DEFMAX].
- [Expansion valves] Units with compressor off: To be fully closed when defrosting starts and the balancing time (30 seconds) is up.
- Units with compressor on: To be opened by [DFSPPS] pulses, synchronized with a step-up of rotation speed, and fully opened [DFPSMX] when the speed reaches [DEFMAX].
- ※ If there is no compressor on machine in one cycle, the above control can be performed by turning the operation bit on and off.
- (4) Special remarks
- During one-cycle heating operation, defrosting should be executed with one cycle only. Other cycles should remain in the stop mode.
  - During 2-cycle heating operation, defrosting is released and finished for both cycles. Therefore, each period may exceed the specified time.
  - If unit fails and stops while defrosting is being executed by a defrosting request issued from another cycle, defrosting will be executed from start (for balancing 90 seconds) after balancing 3 minutes are up and failure is released.

During one-cycle heating operation



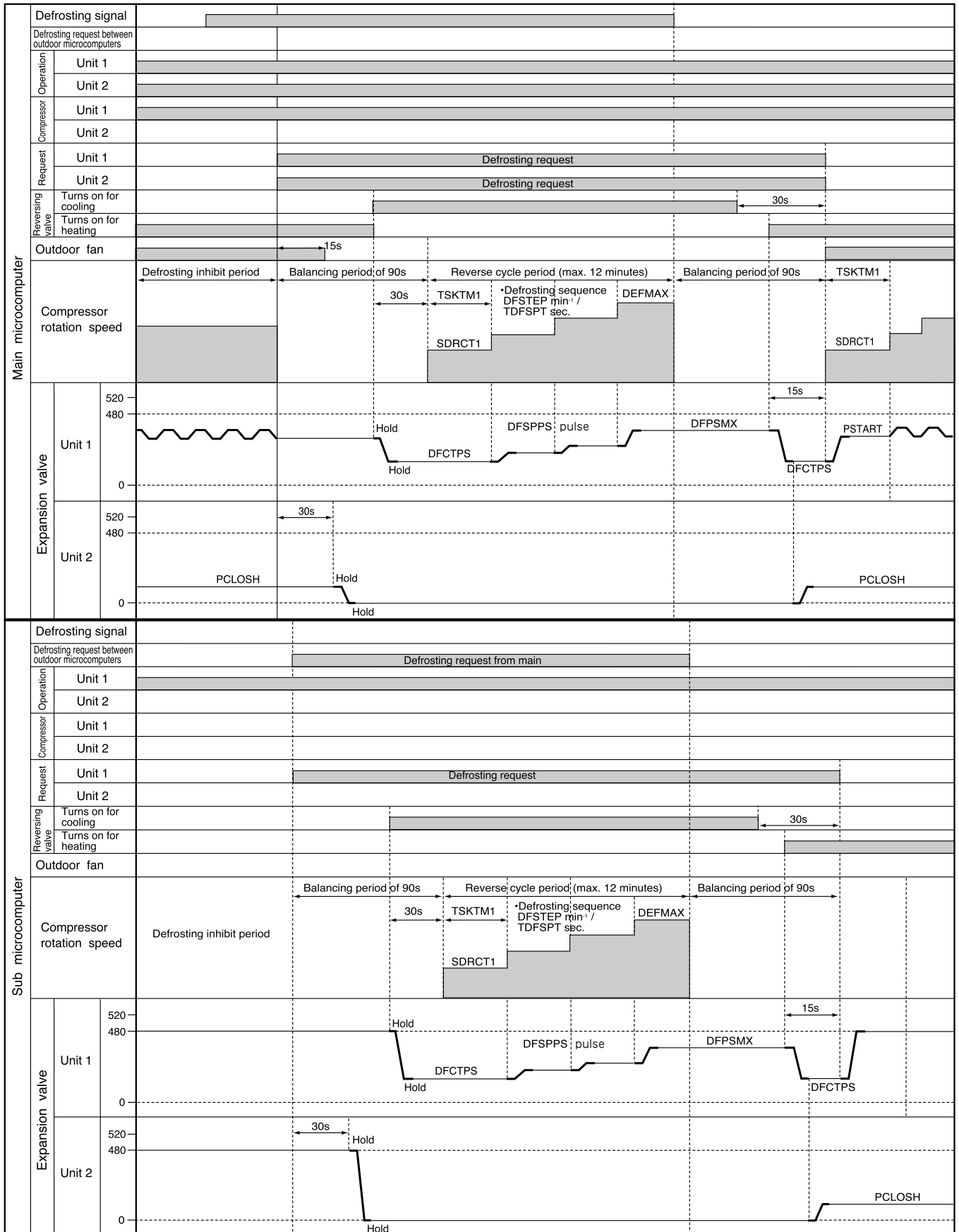
- ※ • See other sections for details of expansion valve TD control,  $\Delta N$  correction and distribution control.
- DEF-ON, DEF-OFF, TSKTM1, SDRCT1, TDFSPT, DFSTEP, DEFMAX, PSTART, DFCTPS, DFSPPS and FLGSET are EEPROM data.

During two-cycle heating operation I (main unit 1: thermostat on/main unit 2: operation stop/sub unit 1: thermostat on/sub unit 2: thermostat off)



※ • See other sections for details of expansion valve TD control, Δ N correction and distribution control.  
• TSKTM1, SDRCT1, DFSTEP, TDFSPT, DEFMAX, DFCTPS, DFSPPS, DFPSMX, PSTART and PCLOSH are EEPROM data.

During two-cycle heating operation II (main unit 1: thermostat on/main unit 2: thermostat off/sub unit 1: thermostat off/sub unit 2: operation stop)



※ • See other sections for details of expansion valve TD control, Δ N correction and distribution control.  
• TSKTM1, SDRCT1, DFSTEP, TDFSPT, DEFMAX, DFCTPS, DFSPPS, DFPSMX, PSTART and PCLOSH are EEPROM data.

## AUTO FRESH DEFROSTING

- If auto fresh conditions are established when heating operation stops, defrosting operation can be executed during the stop period.

Auto fresh defrosting consists of [balancing period of 90 seconds when defrosting starts → reverse cycle period for 12 minutes maximum].

### (1) Auto fresh defrosting defrosting start conditions

- Auto fresh defrosting is performed when all the following conditions are satisfied:
  - 1) Heat-exchanger at low temperature (heat-exchanger temperature  $\leq$  DEF → ON)
  - 2) Units in all cycles stop
  - 3) Auto fresh defrosting inhibit time (15 minutes) is up
  - 4) Compressor is turned on during operation stop
  - 5) There is a delay of compressor from indoor units during operation stop

### (2) Auto fresh defrosting stop conditions

- Auto fresh defrosting is released when any of the following conditions is established:
  - 1) Heat-exchanger temperature is recovered (heat-exchanger temperature  $\geq$  DEF → OFF)
  - 2) Maximum defrosting time (12 minutes) is up
  - 3) A failure occurs
  - 4) Either indoor unit of all cycles starts operation.

※ Release during balancing at start: To stop or start operation when remaining balancing time is up.

Release during reverse cycle period: To stop or start operation when balancing time (3 minutes) is up.

### (3) Outputs during auto fresh defrosting

[Defrosting request between outdoor microcomputers] Not to be transferred.

[Indoor defrosting request] To be transferred only to object unit of auto fresh defrosting (indoor unit which has stopped last).

[Compressor] To increase the speed at the rate of DFSTEP rpm/TDFSPT second and reach the maximum defrosting speed [DEFMAX].

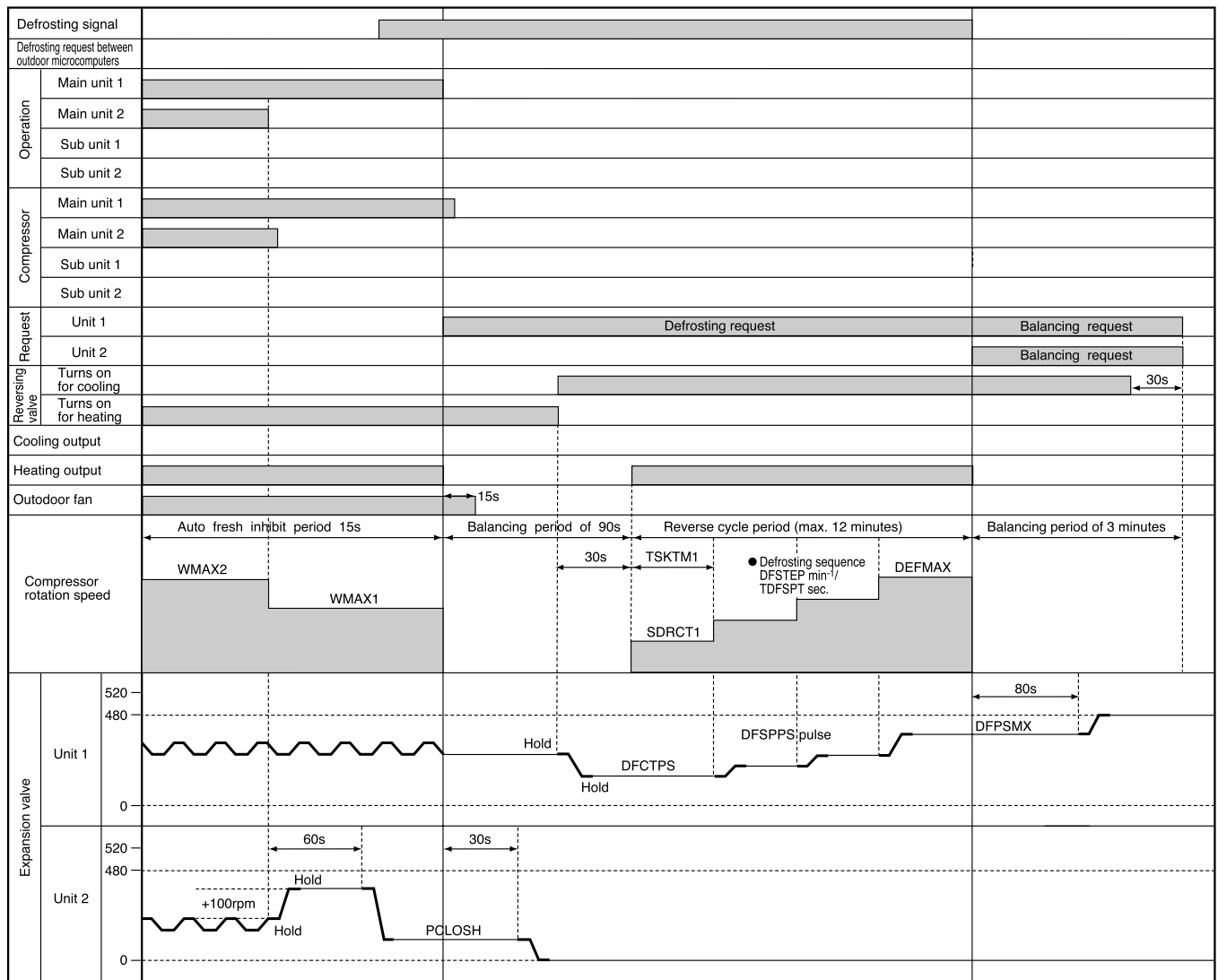
[Expansion valves] Non-object units of auto fresh defrosting: To be fully closed when defrosting starts and the balancing time (30 seconds) is up.

Object units of auto fresh defrosting: To be opened by [DFSPPS] pulses, synchronized with a step-up of rotation speed, and fully opened

[DFPSMX] when the speed reaches [DEFMAX].

### (4) Special remarks

- Other cycles should remain in the stop mode.
- When operation stops during defrosting, the unit should directly shift to auto fresh defrosting.
- All indoor units should stop for auto fresh defrosting. Therefore, if two cycles stop operation simultaneously, auto fresh defrosting will not commence because of delay in communications.



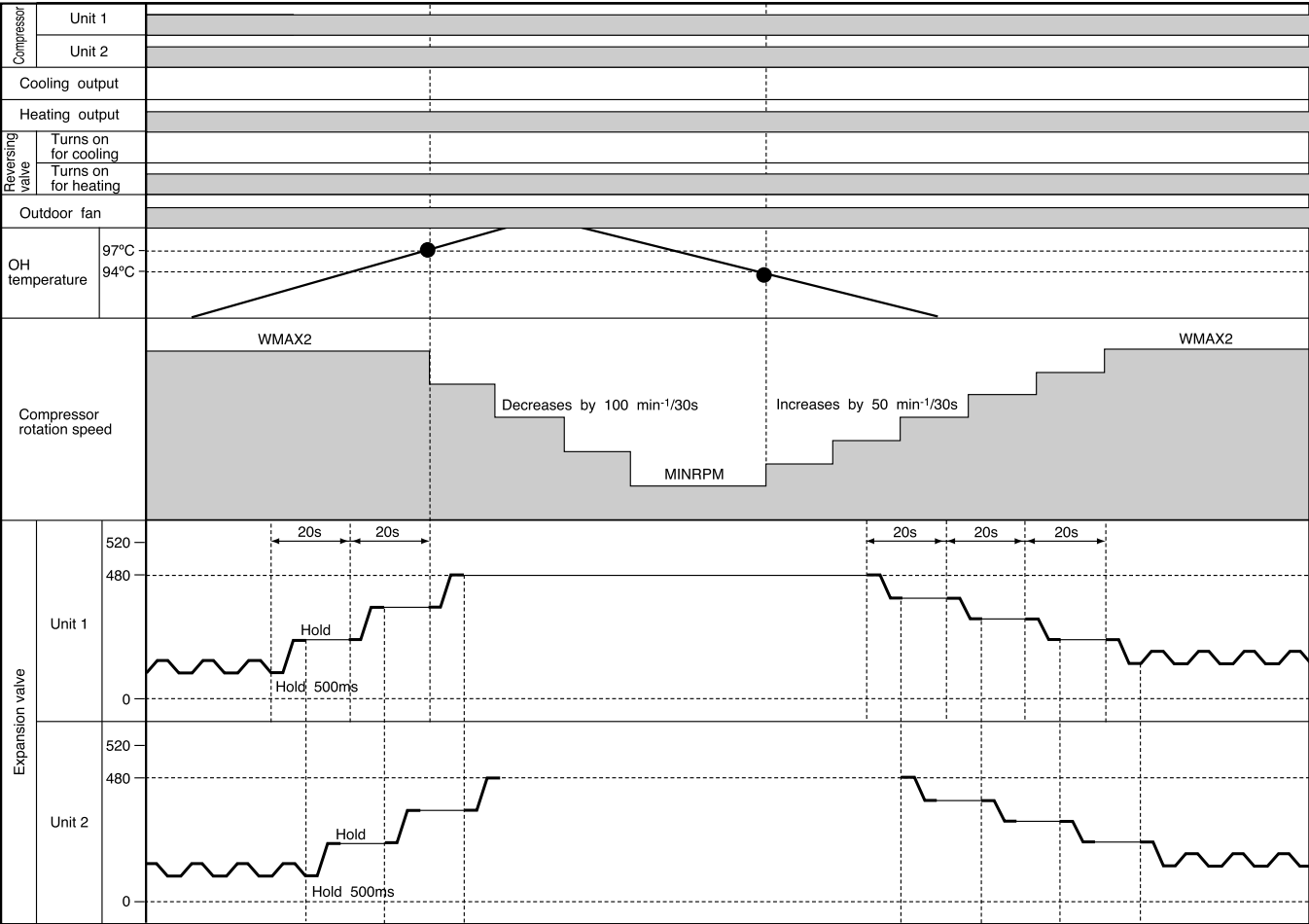
※ • See other sections for details of expansion valve TD control, ΔN correction and distribution control.

• TSKTM1, SDRCT1, DFSTEP, TDFSPT, DEFMAX, DFCTPS, DFSPPS, DFPSMX and PCLOSH are EEPROM data.

PROCESSING AT OVERHEAT THERMISTOR (OH) HIGH TEMPERATURE

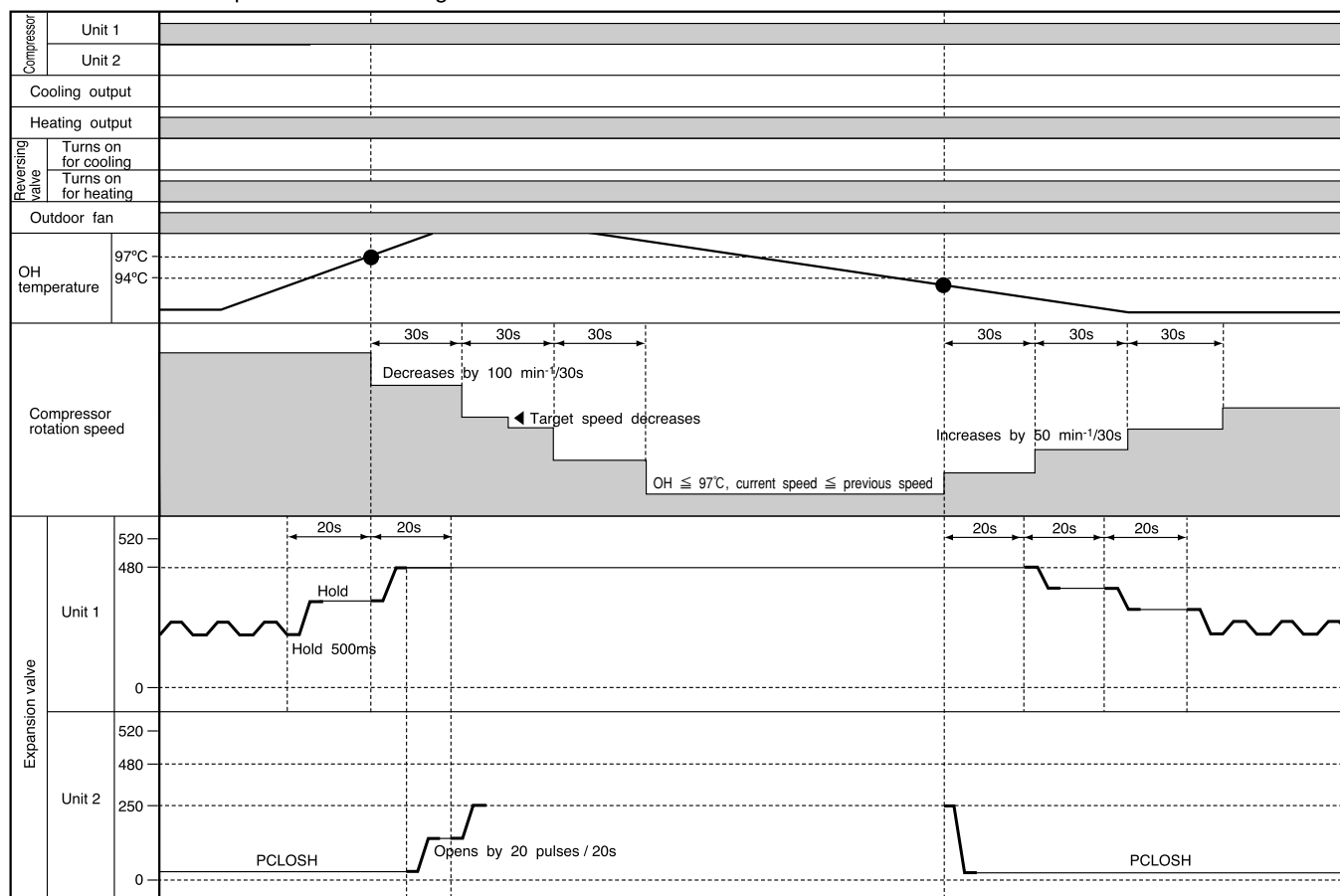
- ◇ Restriction Start Conditions
- [Operating two units] in common for cooling and heating
- When either expansion valve counts 480 pulses and the OH temperature > 97℃ ⇒ the compressor speed will decrease at a rate of 100 min<sup>-1</sup> / 30 second.
- [Operating one unit for cooling]
- When the expansion valve of the operated unit counts 480 pulses and the OH temperature > 97℃ ⇒ the compressor speed will decrease at a rate of 100 min<sup>-1</sup> / 30 second.
- [Operating one unit for heating]
- When the expansion valve of the operated unit counts 480 pulses and the OH temperature ≥ 97℃ ⇒ the expansion valve of stopped unit will open until 250 pulses are counted at a rate of 20 pulses / 20 second.
  - When the expansion valve of the operated unit counts 480 pulses and the OH temperature > 97℃ ⇒ the compressor speed will decrease at a rate of 100 min<sup>-1</sup> / 30 second.
- ※ • The decreasing rotation speed is based on that when reduction processing is started and will hold until decreasing is finished. However, the reference rotation speed will be replaced only when the target speed is lower than that when reduction processing was started.
- Reduction of compressor speed is inhibited when the OH temperature is between 94℃ and 97℃ and does not rise from 30 seconds before.
- ◇ Restriction Release Condition (in common for all)
- Restriction is released when the OH temperature < 94℃ and the compressor speed increases at a rate of 50 min<sup>-1</sup> / 30 second to restore the target speed.

When two units are operated for heating:

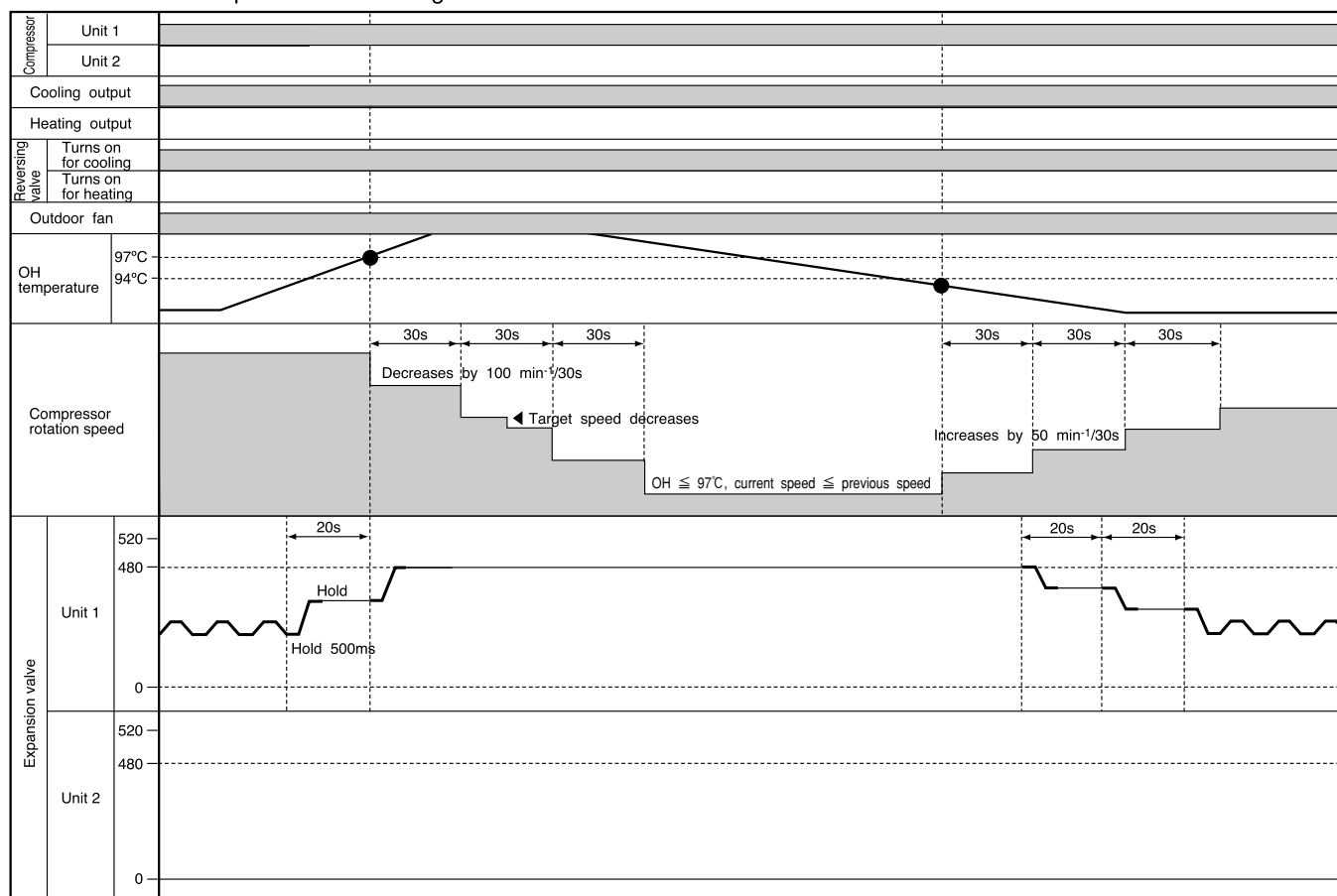


- ※ • Operation when two units are operated for cooling is similar to that shown above.
- WMAX2 and MINRPM are EEPROM data.
  - See other sections for details of expansion valve TD control, ΔN correction and distribution control.

When one unit is operated for heating:



When one unit is operated for cooling:



※ • PCLOSH is EEPROM data.

• See other sections for details of expansion valve TD control,  $\Delta N$  correction and distribution control.

## FORCED COOLING

- Units can be operated in a cooling cycle to collect refrigerant.  
The conditions for execution and operation status are as follows:

### [Conditions for execution]

- Forced cooling operation will be executed when the forced cooling switch is turned ON and there is no record that all indoor units 1-4 have been operated. This system commands the main and sub microcomputers to simultaneously execute forced cooling.
- The main microcomputer monitors operation records of all indoor units 1-4.  
The main microcomputer always monitors the operation status of indoor units. When it detects an operated unit, it inhibits forced cooling.
- Since the forced cooling switch is provided on the main microcomputer side, the main microcomputer transfers the forced cooling command to the sub microcomputer via communication line between outdoor microcomputers. When the sub microcomputer receives this request, it executes forced cooling.

### [Operation status]

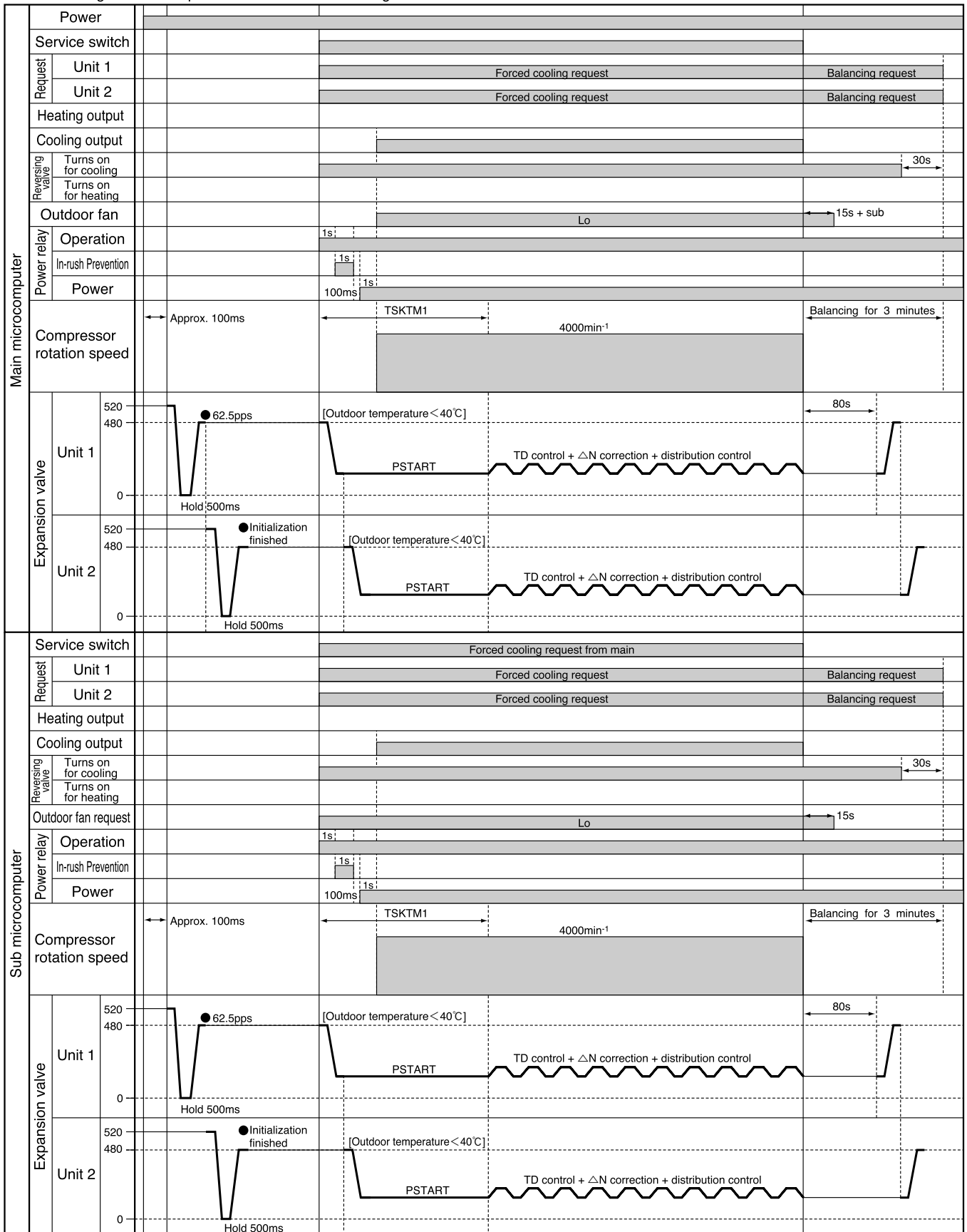
- Outdoor fan: Fixed at B(Lo).
- Compressor rotation speed: Fixed at 4000 min<sup>-1</sup>.
- Expansion valves, Reversing valve: Same as usual operation.

### [Special remarks]

- Thermostat turns OFF when outdoor failure occurs during forced cooling, but this is not counted.
- If it cannot be detected that indoor units for sub microcomputer are being operated because of a delay in communications and the indoor unit for main microcomputer starts forced cooling, the sub microcomputer will continue operation and the main microcomputer will release forced cooling immediately.
- Since the compressor rotation speed is fixed at 4000 min<sup>-1</sup> during forced cooling, the steady speed control when the compressor starts will not be executed.

## FORCED COOLING

• The following shows the operation state of forced cooling.



※ • TSKTM1 and PSTART are EEPROM data.

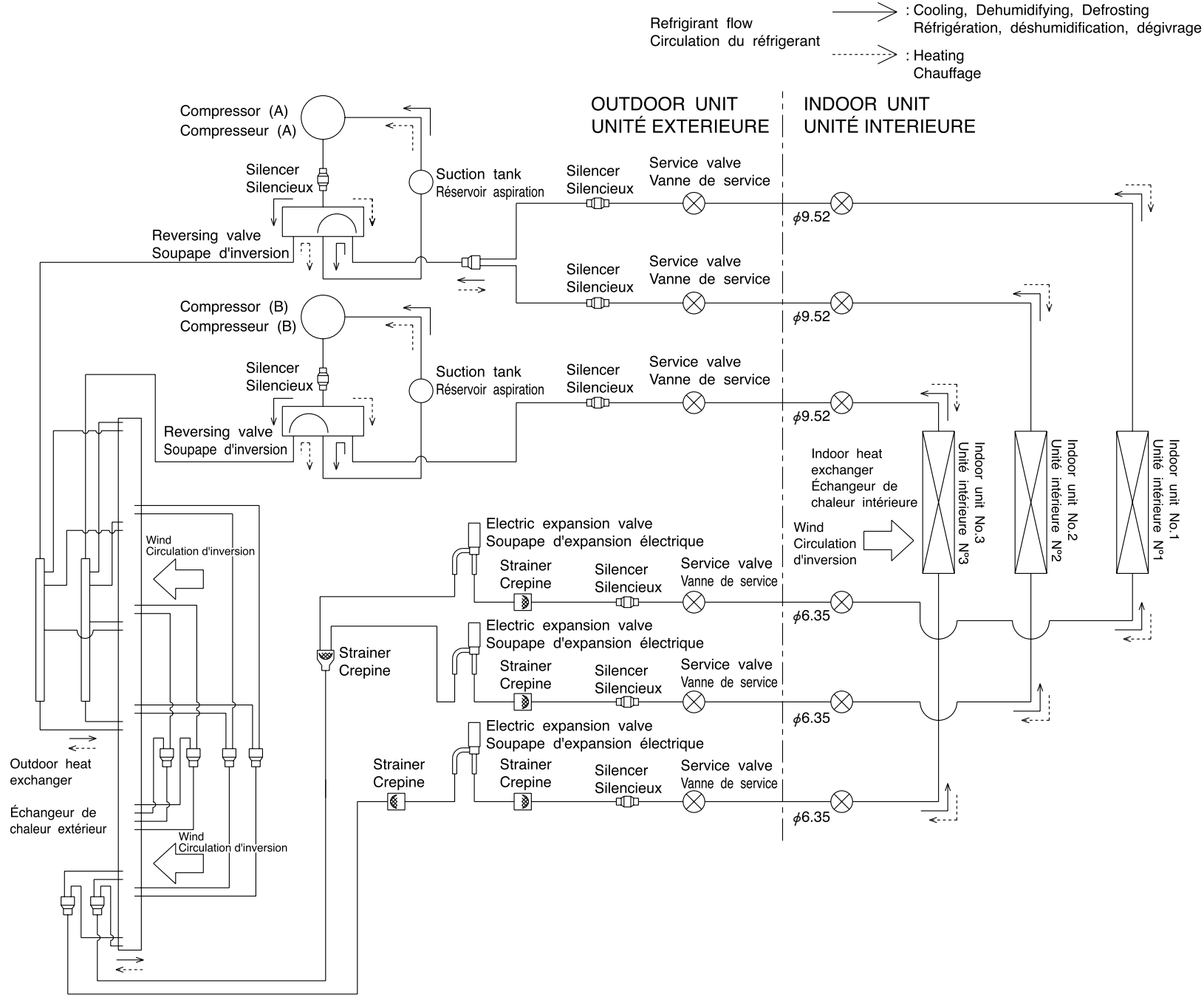
• See other sections for details of expansion valve TD control, ΔN correction and distribution control.



# REFRIGERATING CYCLE DIAGRAM

## SCHEMA FRIGORIFIQUE

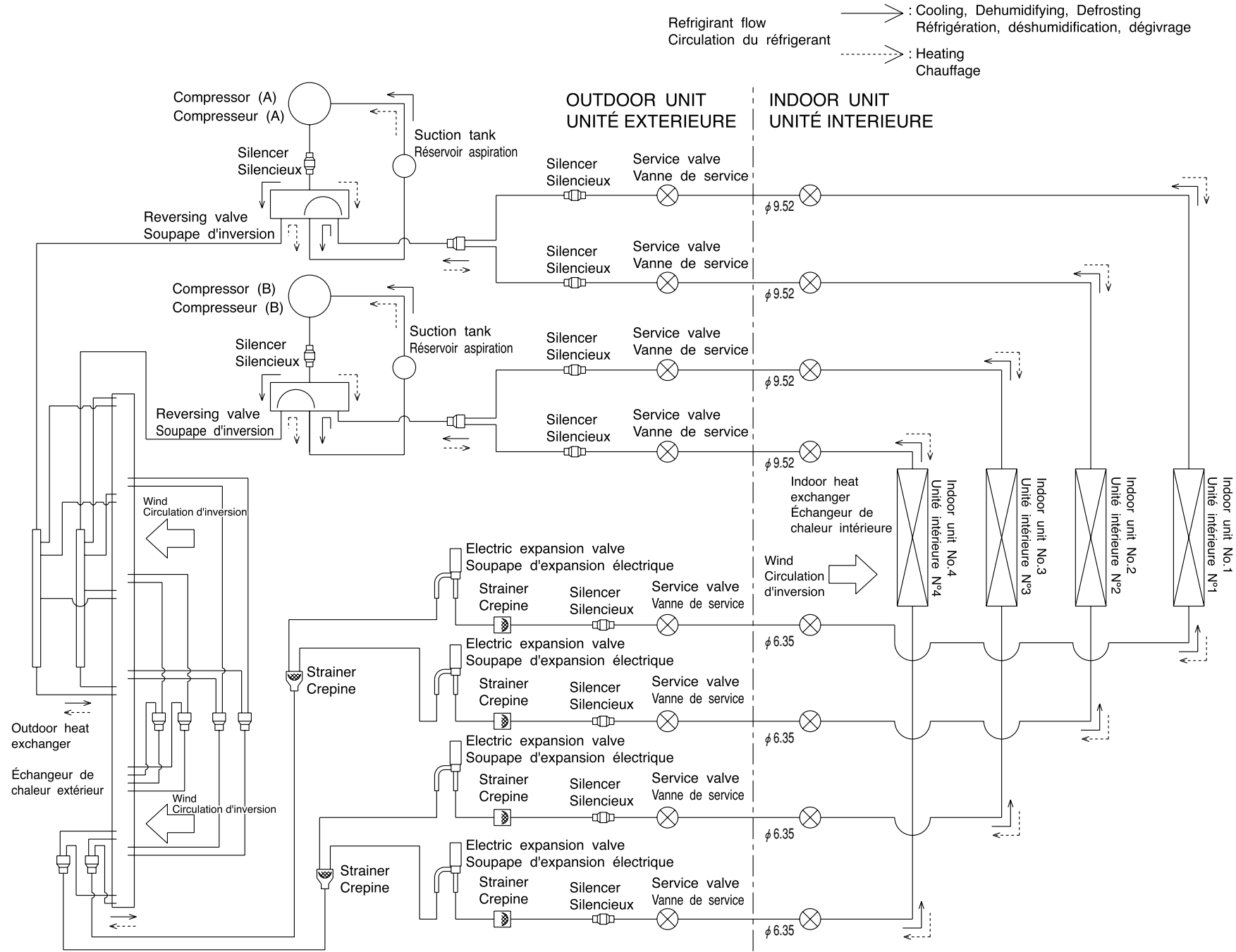
MODEL RAM-70QH4  
MODÈLE



# REFRIGERATING CYCLE DIAGRAM

## SCHEMA FRIGORIFIQUE

MODEL RAM-80QH4  
MODÈLE



## AUTO SWING FUNCTION

MODEL RAD-25QH4, RAD-40QH4

| INPUT SIGNAL                      | PRESENT CONDITION |                                                    |                          | OPERATING SPECIFICATION                                                                                      | REFERENCE                     |
|-----------------------------------|-------------------|----------------------------------------------------|--------------------------|--------------------------------------------------------------------------------------------------------------|-------------------------------|
|                                   | OPERATION         | OPERATION MODE                                     | AIR DEFLECTOR            |                                                                                                              |                               |
| KEY INPUT                         | STOP              | EACH MODE                                          | STOP                     | ONE SWING (CLOSING AIR DEFLECTOR)<br>① DOWNWARD<br>② UPWARD                                                  | INITIALIZE AT NEXT OPERATION. |
|                                   |                   |                                                    | DURING ONE SWING         | STOP AT THE MOMENT.                                                                                          |                               |
|                                   | DURING OPERATION  | AUTO COOL<br>COOL<br>FAN<br>AUTO DRY<br>DRY        | STOP                     | START SWINGING<br>① DOWNWARD<br>② UPWARD<br>③ DOWNWARD                                                       |                               |
|                                   |                   |                                                    | DURING SWINGING          | STOP AT THE MOMENT.                                                                                          |                               |
|                                   |                   | AUTO HEAT<br>HEAT<br>CIRCULATOR                    | STOP                     | START SWINGING<br>① DOWNWARD<br>② UPWARD<br>③ DOWNWARD                                                       |                               |
|                                   |                   |                                                    | DURING SWINGING          | STOP AT THE MOMENT.                                                                                          |                               |
| THERMO. ON<br>(INTERNAL FAN ON)   | DURING OPERATION  | AUTO DRY<br>DRY<br>AUTO HEAT<br>HEAT<br>CIRCULATOR | TEMPORARY STOP           | START SWING AGAIN.                                                                                           |                               |
| THERMO. OFF<br>(INTERNAL FAN OFF) |                   |                                                    | DURING SWINGING          | STOP SWINGING TEMPORARILY.<br>(SWING MODE IS CLEARED IF SWING COMMAND IS TRANSMITTED DURING TEMPORARY STOP.) |                               |
| MAIN SWITCH ON                    | STOP              | COOL<br>FAN<br>DRY                                 | STOP<br>DURING ONE SWING | INITIALIZE<br>① DOWNWARD<br>② UPWARD                                                                         |                               |
|                                   |                   | HEAT<br>CIRCULATOR                                 | STOP<br>DURING ONE SWING | INITIALIZE<br>① DOWNWARD                                                                                     |                               |
| MAIN SWITCH OFF                   | DURING OPERATION  | EACH MODE                                          | STOP<br>DURING SWINGING  | ONE SWING (CLOSING AIR DEFLECTOR)<br>① DOWNWARD<br>② UPWARD                                                  | INITIALIZE AT NEXT OPERATION. |
|                                   |                   |                                                    | DURING<br>INITIALIZING   |                                                                                                              |                               |
| CHANGE OF OPERATION               | DURING OPERATION  | EACH MODE                                          | STOP                     | INITIALIZING CONDITION OF EACH MODE.                                                                         |                               |
|                                   |                   |                                                    | DURING SWINGING          | STOP SWINGING AND MODE BECOMES<br>INITIALIZING CONDITION.                                                    |                               |

## MODEL RAF-25NH4, RAF-50NH4

Fig. 1—1

Furthermore, 5V (5V line), which is necessary to drive the microcomputer and to control the fan motor, is generated using three-terminal regulator IC121.

## 2. Reset Circuit

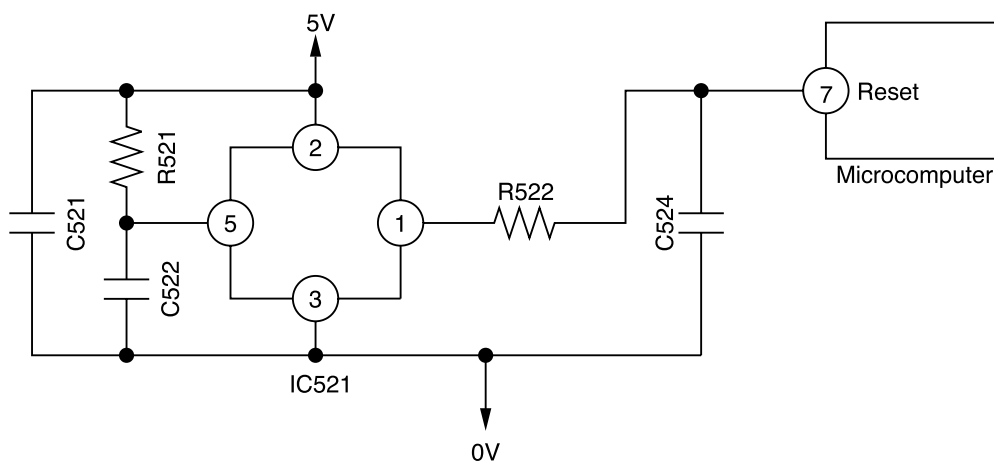


Fig.2-1

### Timing chart

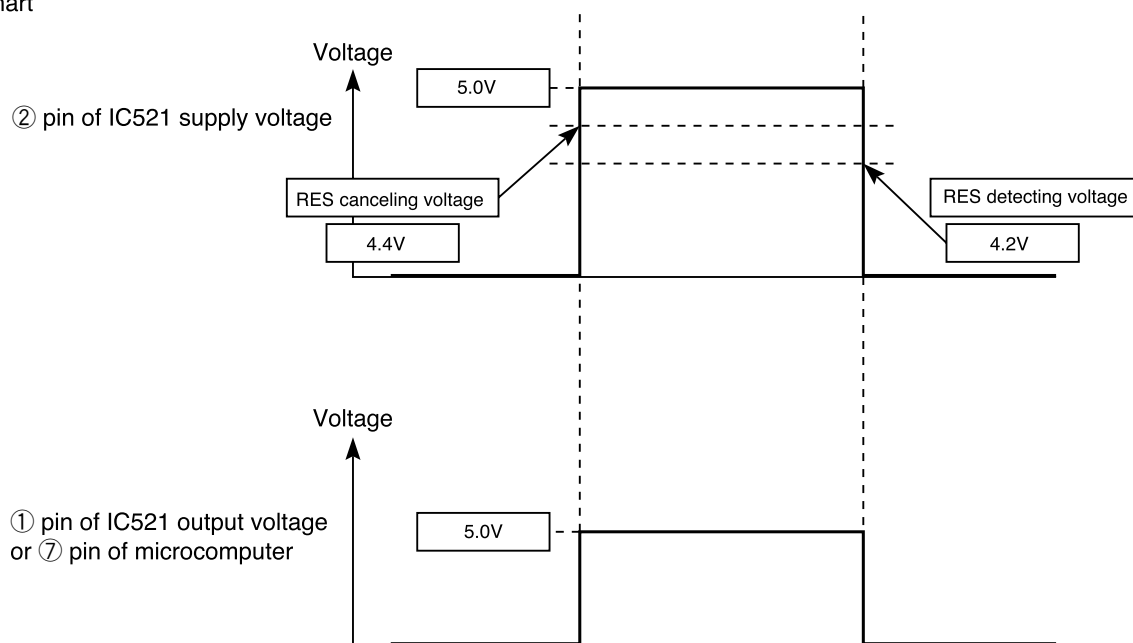


Fig.2-2

- Reset circuit is to initialize the indoor unit microcomputer when switching ON the power or after recovering from power failure.
- Microcomputer operates when ⑦ pin of the indoor unit microcomputer (reset input) is "Lo" for resetting and "Hi" for hitting.
- Waveform of each part when switching ON the power and when shutting down is shown in the Fig. 2-2.
- After switching ON the power, ① pin of IC521 and ⑦ pin of microcomputer becomes Hi when DC5V line rises and reaches approximately 4.4V or higher. Then, resetting will be cancelled and microcomputer starts operating.
- After shutting down the power, ① pin of IC521 and ⑦ pin of microcomputer becomes Lo when DC5V line falls and reaches approximately 4.2V or lower. Then, the microcomputer will be in reset condition.

### 3. Room Temperature Thermistor Circuit

A room temperature thermistor circuit is shown in Fig. 3-1.

According to room temperature, the voltage of point ① becomes as it is shown in Fig.3-2.

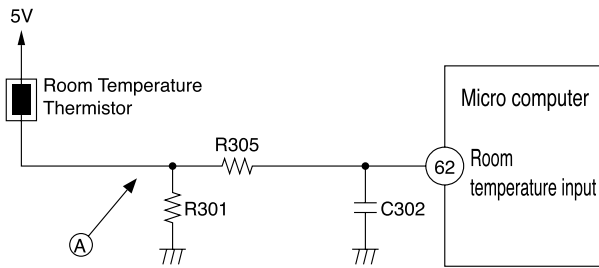


Fig. 3-1

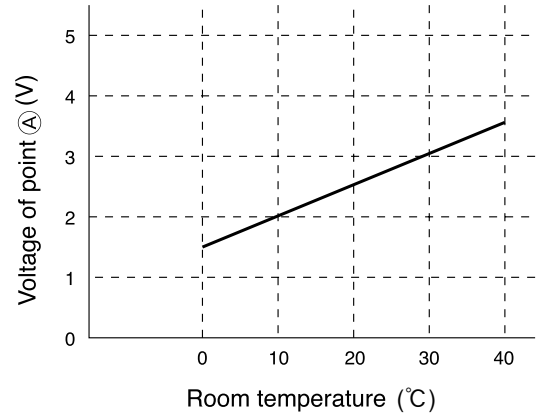


Fig. 3-2

### 4. Heat Exchanger Thermistor Circuit

Heat exchanger temperature is noticed inside the room

- (1) Preheating
- (2) Low-temperature defrosts at cooling•dehumidification operation time.
- (3) Not working of reversing valve or detection of opening of heat exchange thermistor is controlled.

According to heat exchange temperature, the voltage of point ① becomes as it is shown in Fig. 4-2.

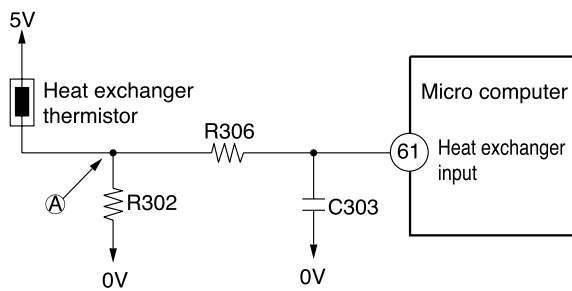


Fig. 4-1

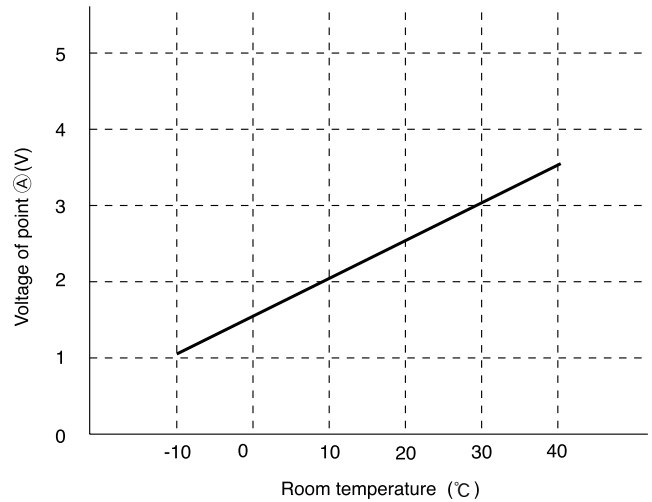


Fig. 4-2

### 5. Humidity Sensor Circuit

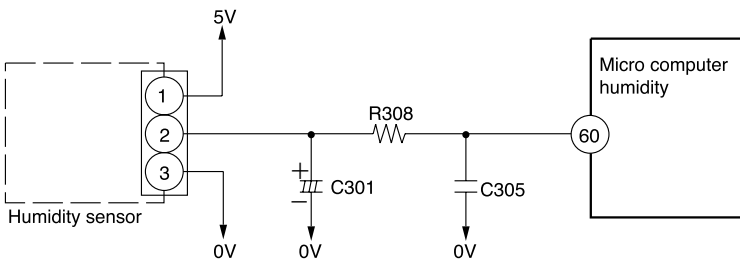


Fig. 5-1

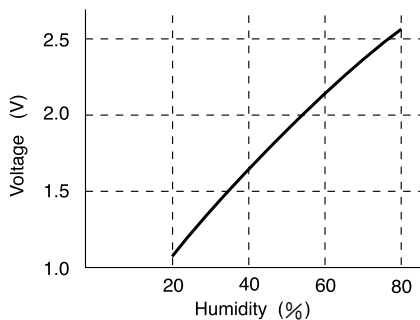


Fig. 5-2

- From the output (② pin) of humidity sensor, the 5V pulse3 of different width is output according to detected humidity. Smooth output pulse is carried out by C301 and it changes into the characteristic of voltage-humidity as shown in Fig.5-2. The micro computer detects and controls humidity by reading this voltage directly.

## 6. Fan Motor Drive Circuit

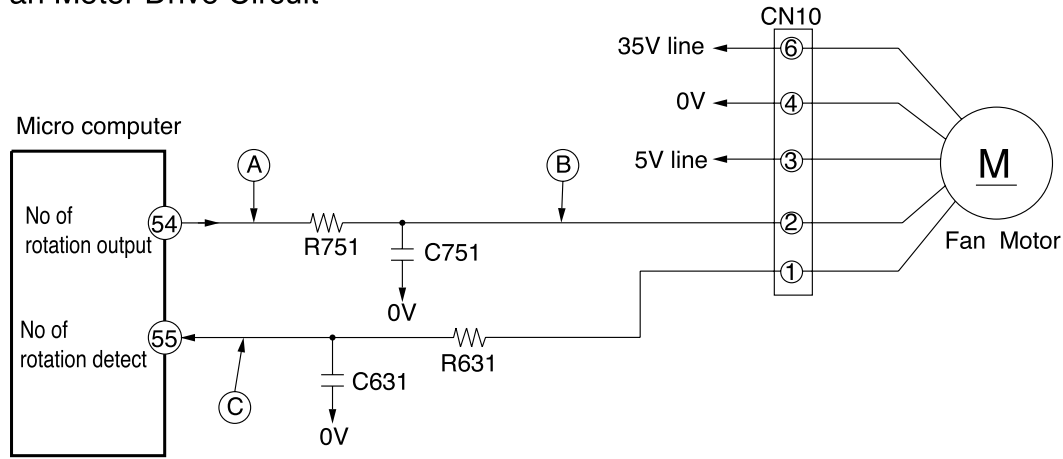


Fig. 6-1

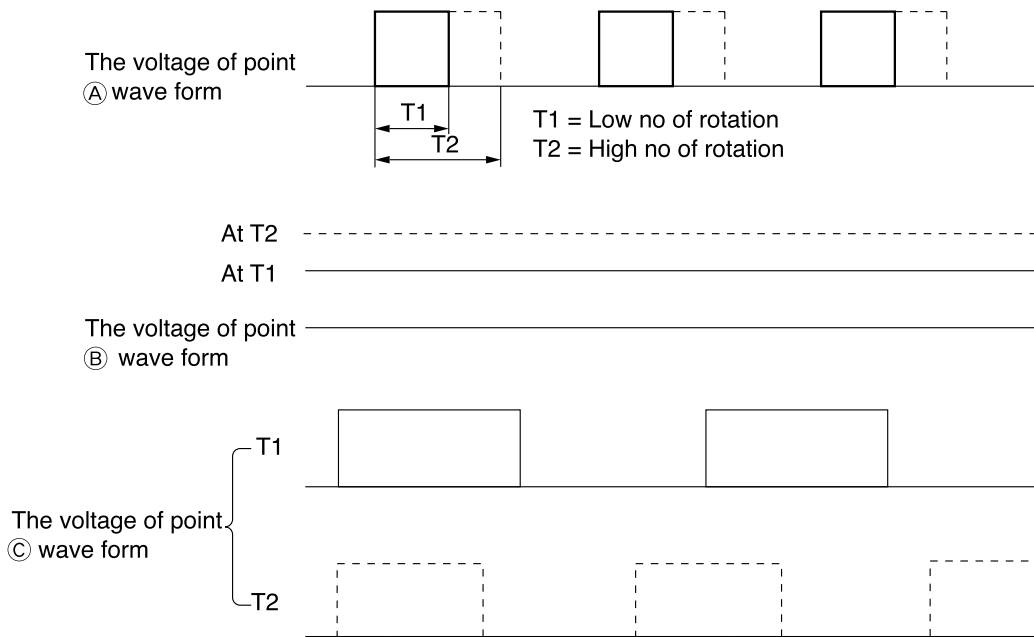


Fig. 6-2

- The 15.7 kHz PWM pulse shown in Fig.6-2 from the micro computer pin 54 is output to point A. The width of this pulse changes with instruction number of rotations.
- This pulse changes to analog voltage by R751 and C751 and it is applied to the fan motor as instruction voltage number of rotations. The relationship between the voltage of point B and number of rotations becomes as shown in Fig.6-3. (The gap may arise depending on the condition of unit.)
- The feedback pulse of number of rotation is outputted from the fan motor and input to micro computer pin 55. The frequency of this pulse is 12/60 of the number of rotations. (Ex:  $1000\text{min}^{-1} \times 12/60 = 200\text{Hz}$ ) The micro computer observes this frequency and to make it as the instruction number of rotation all the time, adjusts the output pulse width of pin 54.
- If the feedback pulse becomes lower than  $100\text{min}^{-1}$  caused by lock or failure of a fan motor, the fan output stops temporary as the fan lock is faulty. The pulse will output again after 10 seconds. If the abnormal in fan lock is detected twice in 10 minutes, the unit is completely stopped and change to the fault mode which the timer lamp blinks 10 times.

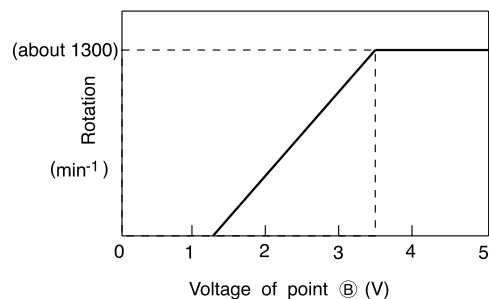


Fig. 6-3

# Damper control

## 1. Precondition

The damper has 2-directional output and realizes OPEN/CLOSE using a stepping motor.

Damper control functions only when the Air outlet SW is set to " ".



## 2. OPEN/CLOSE Operation

### (1) OPEN operation

Start up the damper towards OPEN direction by overall angle width [DNPALD1]. When the start up completes, turn off the output.

### (2) CLOSE operation

Start up the damper towards CLOSE direction by overall angle width [DNPALD1] + tightening angle [CNPPLS1]. When start up completes, turn off the output.

## 3. Initial Operation

Initial operation is performed only once when the main power is switched ON. The damper should be operated as follows due to its structure.

① Damper OPEN (Damper limit SW = OFF signal)

② Damper CLOSE (Damper limit SW = ON signal)

Its travel speed is pulse output speed [DNPPPS].

## 4. Monitor Function of Damper Limit SW

Monitoring of damper limit SW is inhibited during start up and for 2 seconds after starting up the damper, after which the damper limit SW will be monitored.

(1) Damper limit SW signal at the completion of initial operation is monitored. If the signal is OFF, it is judged as malfunction and the malfunction mode is entered immediately.

(2) Monitoring of damper limit SW signal is inhibited while the unit is stopped.

(3) Damper limit SW is always monitored while the unit is in operation. Right after the unit operation is started, however, malfunction judgment is not made and the damper performs the following operation.

When "ON" signal is detected (Normal signal): Start up towards CLOSE direction by tightening angle.

When "OFF" signal is detected (Abnormal signal): Start up towards CLOSE direction by overall angle width plus tightening angle.

(4) After performing the above operation, malfunction judgment will always be carried out. If abnormality is detected for 4 times consecutively within 30 minutes, the malfunction mode is entered at the moment the 4th abnormality is detected.

In the case where 3 or less abnormality are detected, retry operation is performed.

Abnormal OPEN location

If the signal is "ON", the damper is judged to be at CLOSE location (abnormal). The retry operation, which is the same as OPEN operation by overall angle width, will be performed.

Abnormal CLOSE location

If the signal is "OFF", the damper is judged to be at OPEN location (abnormal). The retry operation, which is the same as CLOSE operation by overall angle width + tightening angle, will be performed.

(5) Self diagnosis mode of the damper is indicated by "Timer lamp blinks for 8 times".

## 5. Damper operation by operating modes

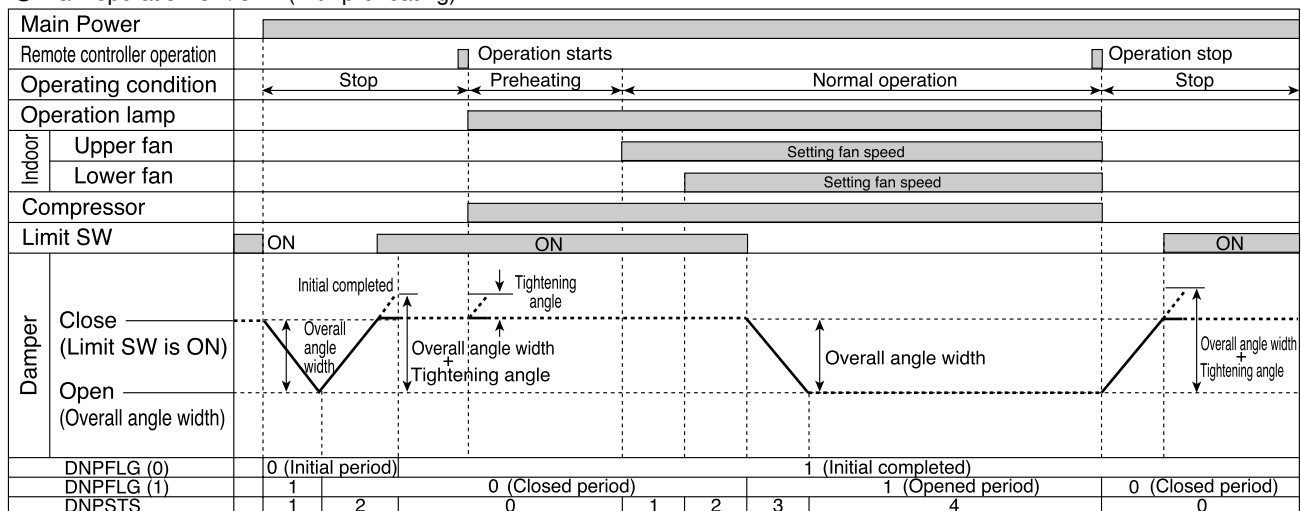
The damper functions only during heating and cooling operation. It stays closed during other operating modes.

### Heating mode

The damper is open during normal heating operation (except for 10 seconds after thermo resumes, during sleep operation and during nice temperature). It is closed during other types of operation.

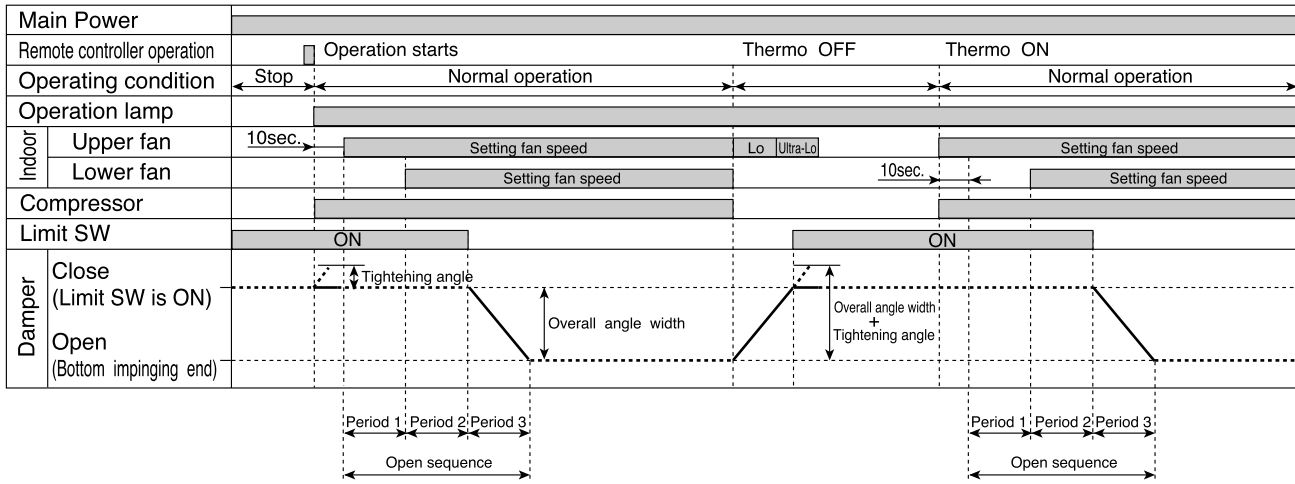
The damper closes immediately if the damper changeover SW is set to "manual". When the damper is starting up, however, it closes only after open operation completed.

### ● Main operation ON/OFF (with preheating)

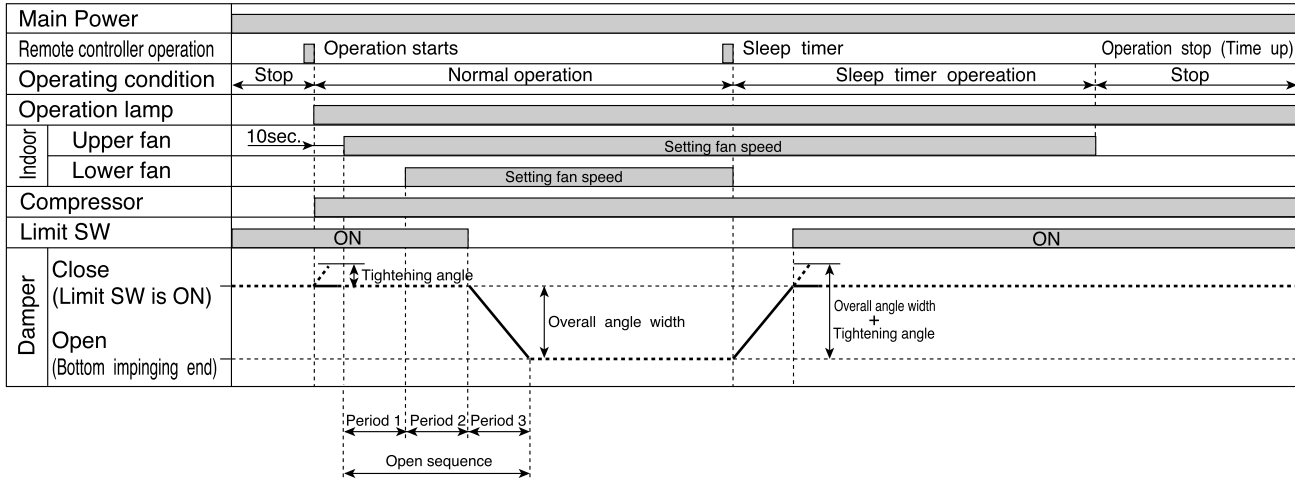




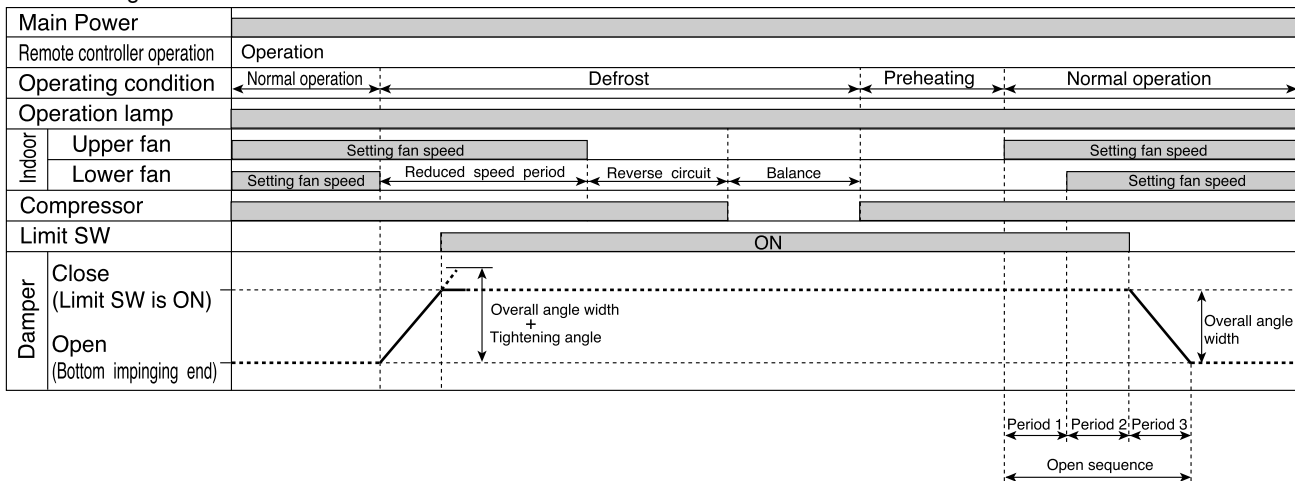
### ● Thermo intermittence



### ● Sleep Timer




### ● Reversing valve defrost

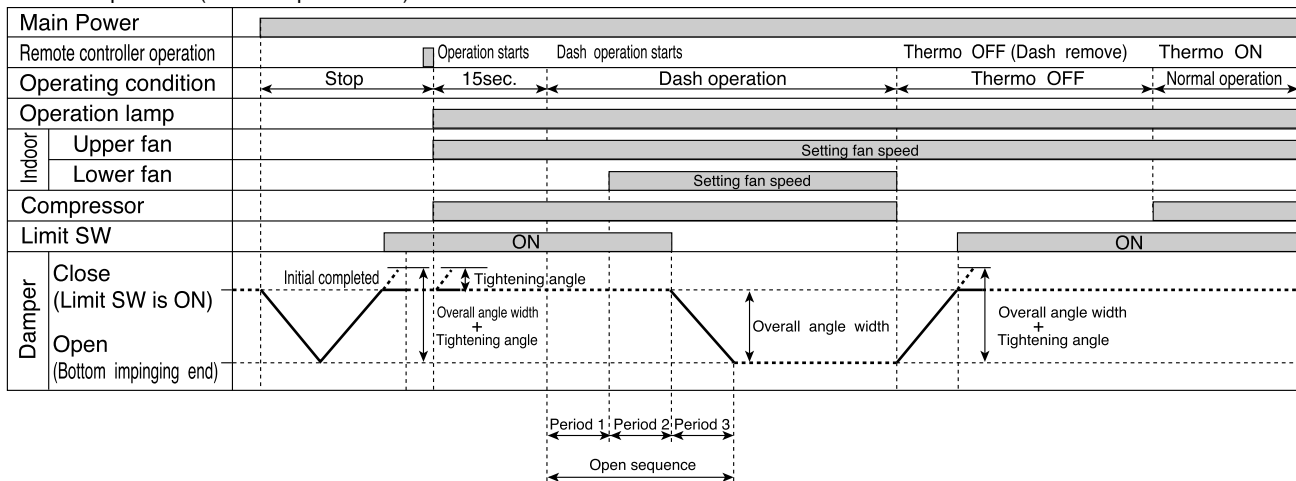


## Cooling mode

The damper opens at cool dash (excluding smell prevention) and closes at the completion of cool dash.

The damper also closes at the moment the Air outlet SW is set to “”.

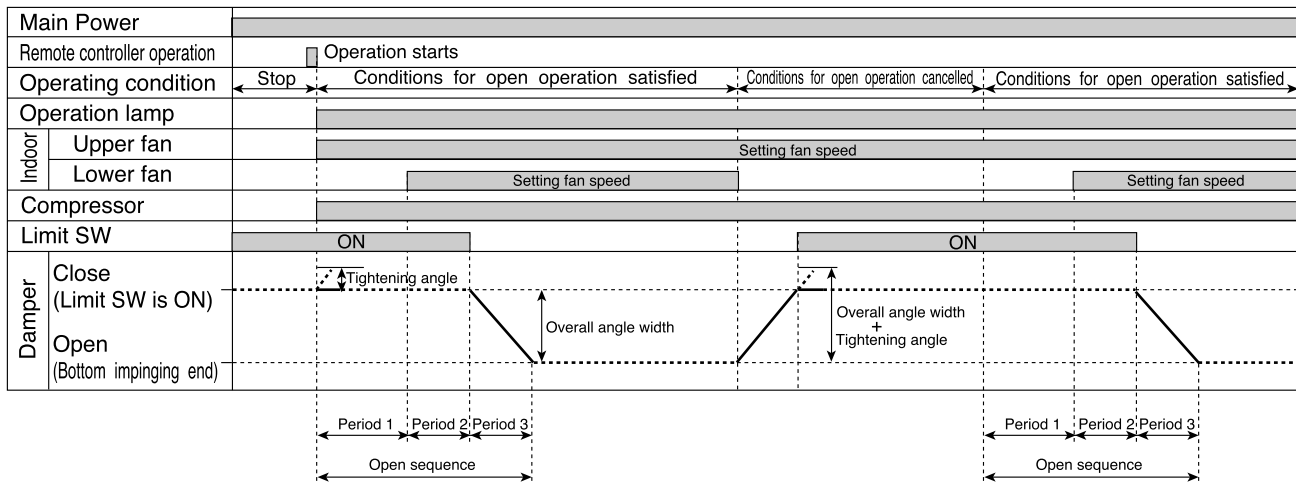
### ● Dash operation (no smell prevention)



### ● Damper open operation (except dash)

This function is allowed when the damper open control select flag on EEPROM at cooling operation and fan speed of HI is set to [FLGET8 (3) = 1] and all the following conditions are satisfied. If any of the following conditions is unsatisfied, the damper will be closed.

- Operating mode: “Manual cooling”
- Preset fan speed: “Hi”
- Preset temperature: “16°C”
- [Room temperature (RMTM) – Final preset temperature (THERW2)]  $\geq$  [ONDOSA] However, the condition (d) will be cancelled when [Room temperature (RMTM) – Final preset temperature (THERW2)]  $\leq$  [ONDOSA].
- Thermo ON condition (ASTUS=3)



## DESCRIPTION OF MAIN CIRCUIT OPERATION

MODEL RAD-25QH4, RAD-40QH4

### 1.Reset Circuit

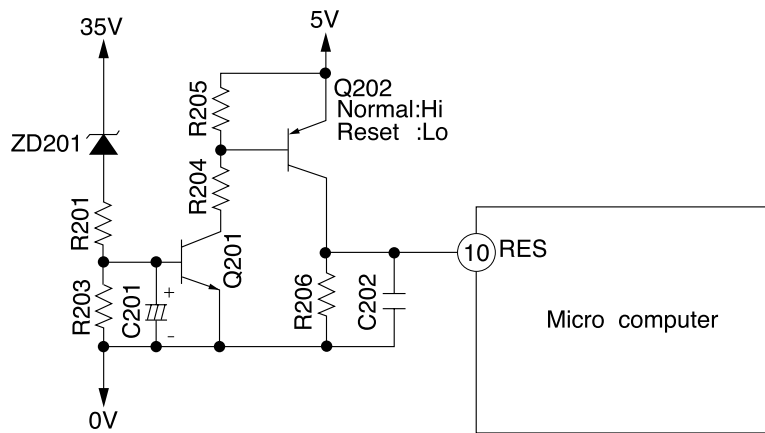


Fig.1-1

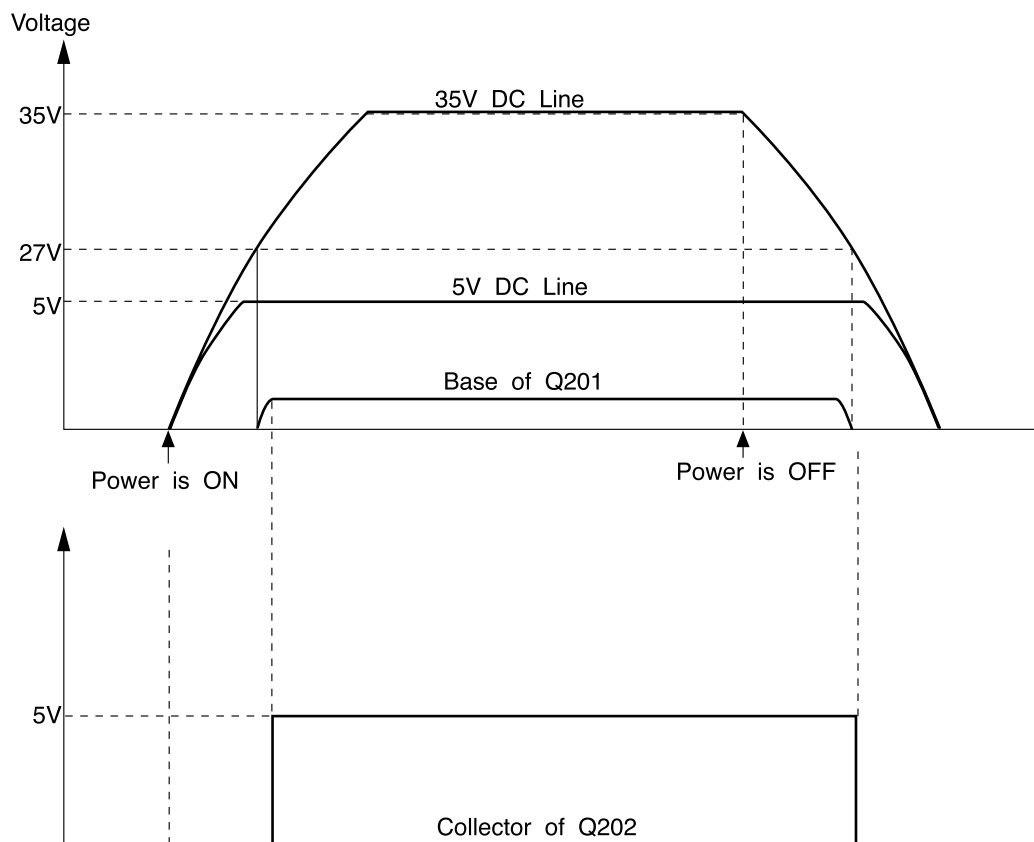
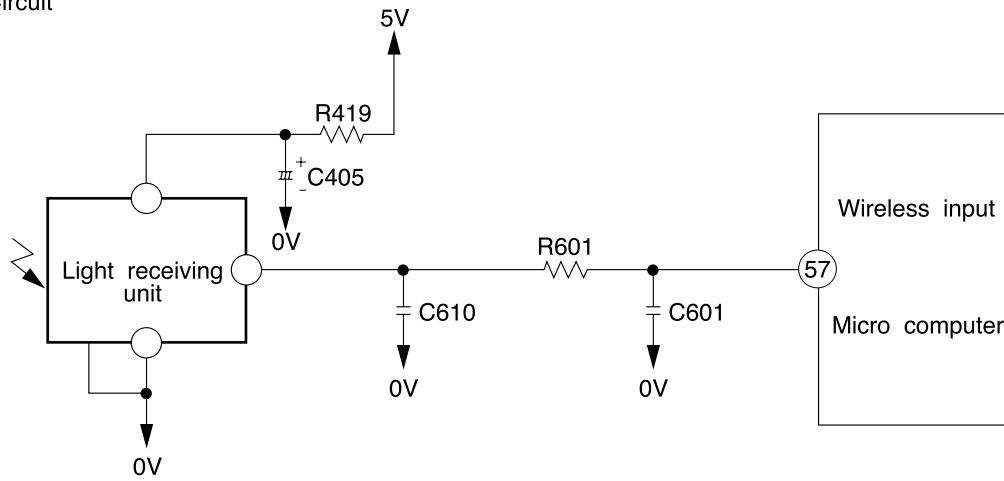


Fig.1-2

- The reset circuit initializes the program when power is supplied or power is restored following a power failure.
- RESET "Lo" or SET "Hi" activates the micro computer.
- Fig.1-2 shows the waveforms in each circuit when power is ON and OFF.
- When power is supplied, the voltages on the 35V and 5V DC lines rise, and when the 35V DC line becomes approx. 27V, ZD201 turns on and the voltage at the base of Q201 rises to turn Q201 on. Since the collector of Q201 goes "Lo" at this time, Q202 turns on and the reset input of the micro computer goes "Hi". The 5V DC line has already been 5V at this time and the micro computer starts operation.
- When power is OFF, the voltage on the 35V DC line drops, and when it is approx. 27V, ZD201 turns off, Q201 and Q202 turn off, and the reset input of the micro computer goes "Lo" to reset it.

## 2.Receive Circuit



- The Light receiving unit receives an infrared signal from the wireless remote control. The receiver amplifies and shapes the signal and outputs it.

## 3.Buzzer Circuit

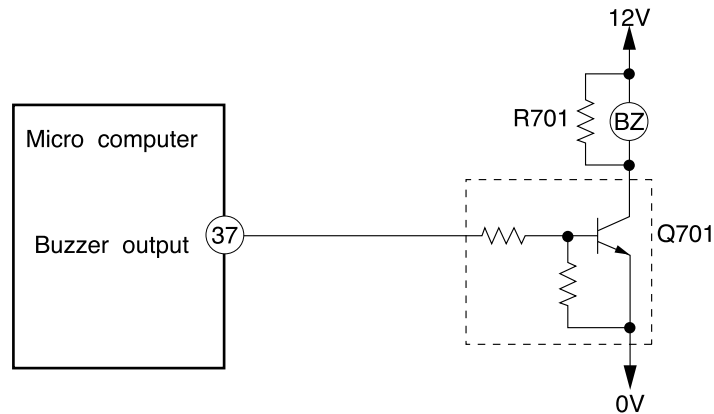


Fig.3-1 Buzzer Circuit

- When the buzzer sounds, an approx. 3.9kHz square signal is output from buzzer output pin ③⑦ of the micro computer. After the amplitude of this signal has been set to 12Vp-p by a transistor, it is applied to the buzzer. The piezoelectric element in the buzzer oscillates to generate the buzzer's sound.

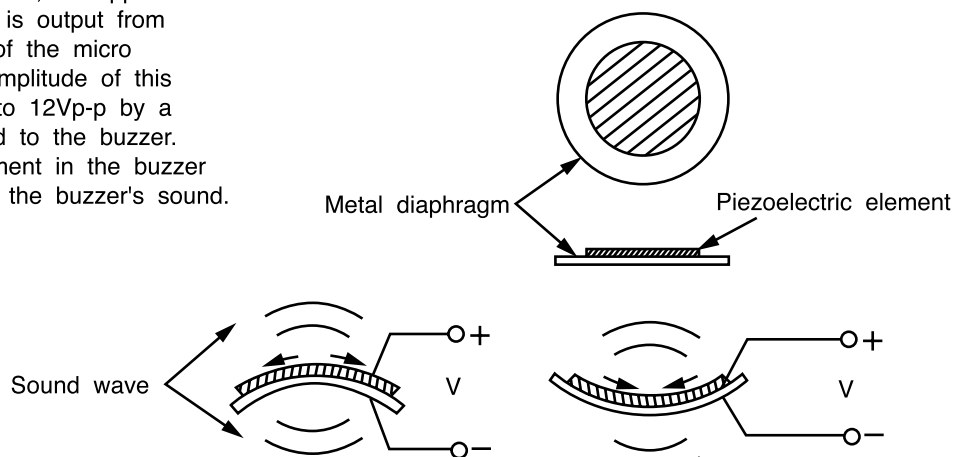


Fig.3-2 Buzzer Operation

4.Auto Sweep Motor Circuit

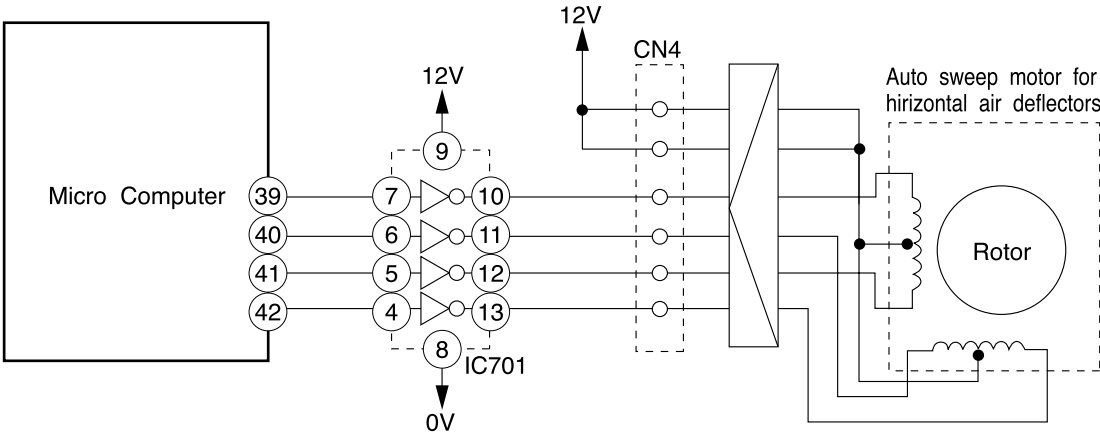


Fig.4-1 Auto Sweep Motor Circuit (Horizontal air deflectors)

• Fig.4-1 shows the Auto sweep Motor drive cicuit; the signals shown in Fig.4-2 are output from pins ③⑨-④② of the micro computer.

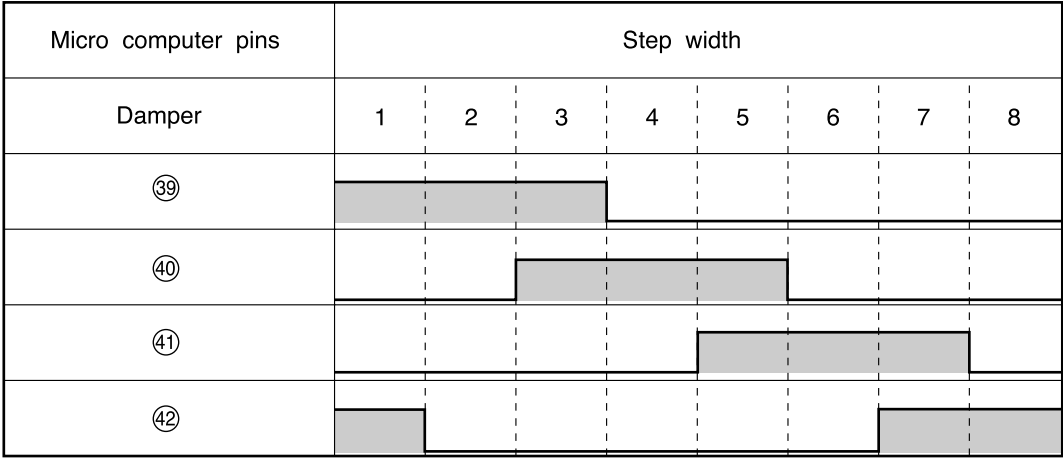


Fig.4-2 Micro computer Output Signals

• As the micro computer's outputs change as shown in Fig.4-2, the core of the stepping motor is excited to turn the rotor. Table 4-1 shows the rotation angle of horizontal air deflectors.

Table 4-1 Auto sweep Motor Rotation

|                           | Rotation angle per step(° ) | Time per step(ms.) |
|---------------------------|-----------------------------|--------------------|
| Horizontal air deflectors | 0.0882                      | 10                 |

• The Auto sweep motor (sub) drive circuit operates in the same way.

## 5.Room Temperature Thermistor Circuit

Fig. 5-1 shows the room temperature thermistor circuit.

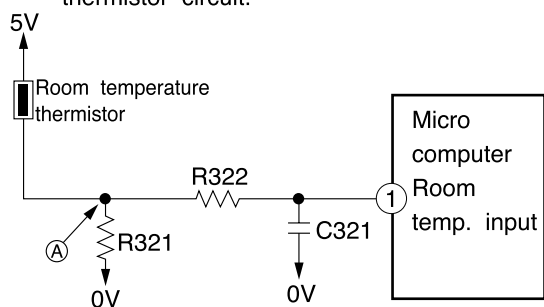


Fig. 5-1

The Voltage at ① depends on the room temperature as shown in Fig. 5-2

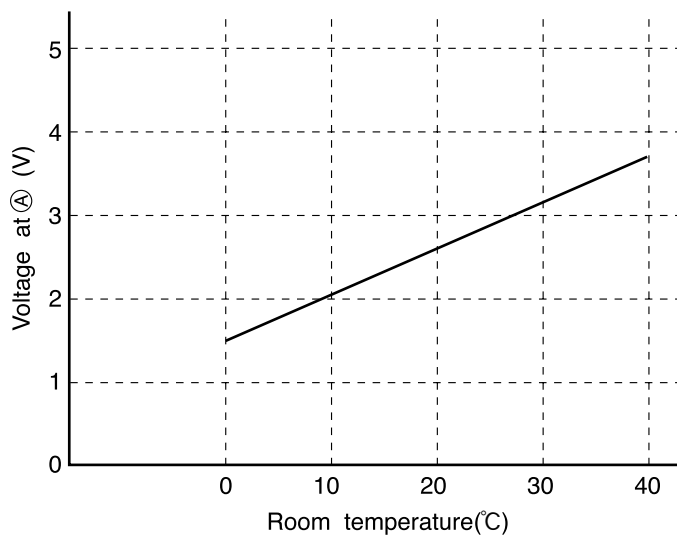


Fig. 5-2

## 6.Heat exchanger temperature thermistor circuit

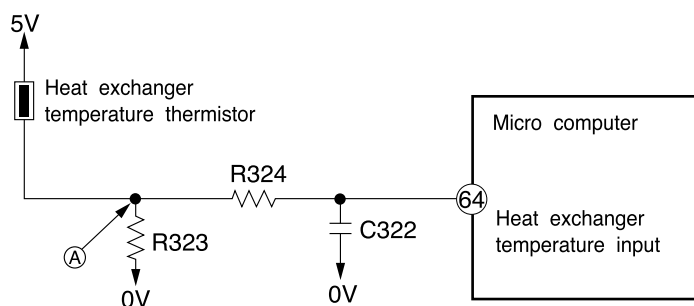


Fig. 6-1

The circuit detects the indoor heat exchanger temperature and controls the following.

- (1) Preheating.
- (2) Low-temperature defrosting during cooling and dehumidifying operation.
- (3) Detection of the reversing valve non-operation or heat exchanger temperature thermistor open.

The voltage at ① depends on the heat exchanger temperature as shown in Fig. 6-2

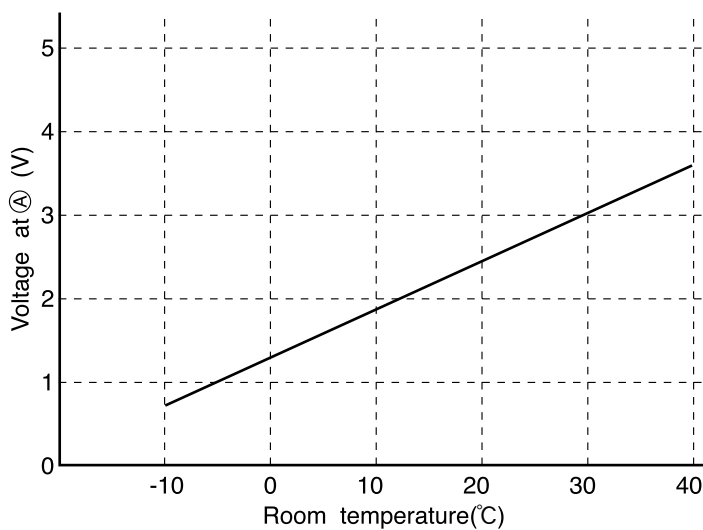


Fig. 6-2

## 7. Initial Setting Circuit (IC401)

- When power is supplied, the micro computer reads the data in IC401 (E<sup>2</sup>PROM) and sets the preheating activation value and the rating and maximum speed of the compressor, etc. to their initial values.

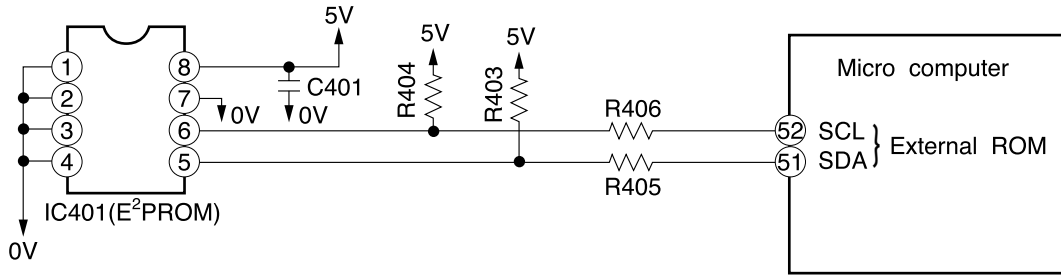


Fig. 7-1

## 8. Temporary Switch

INDICATION P.W.B.

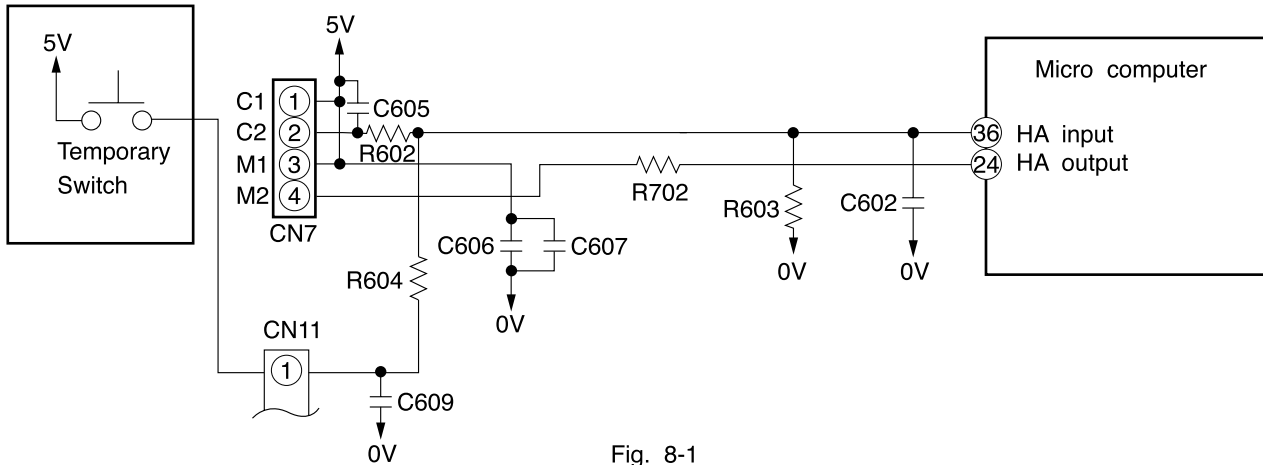


Fig. 8-1

- The temporary switch is used to operate the air conditioner temporarily when the wireless remote control is lost or faulty.
- The air conditioner operates in the previous mode at the previously set temperature. However, when the power switch is set to OFF, it starts automatic operation.

## 9. Drain pump drive circuit

When cool or dehumidifying operation, pin 30 of the micro computer goes "Hi", Q905 turn on and the drain pump drive.

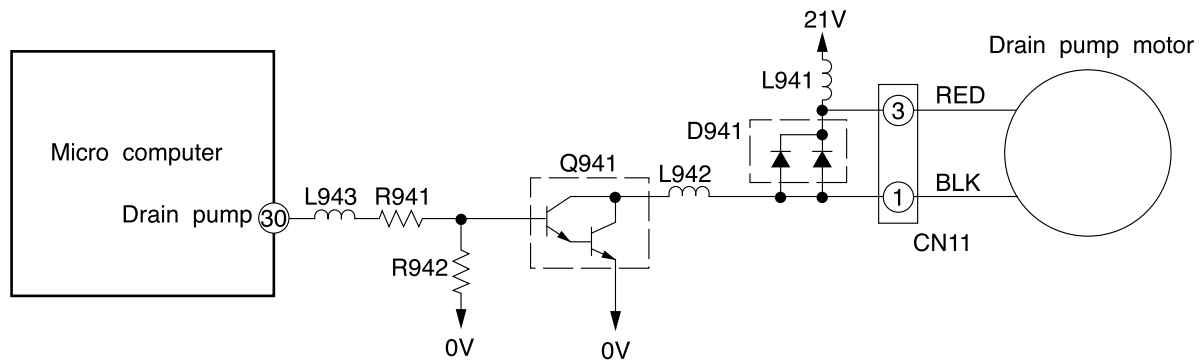
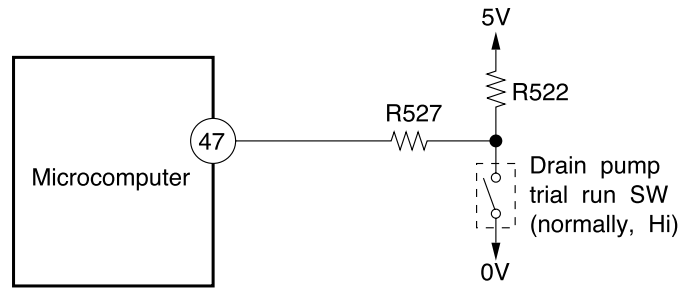


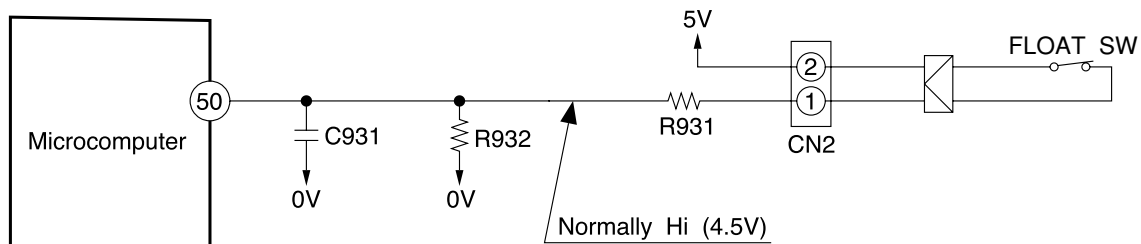
Fig. 9-1

#### 10. Drain pump trial run switch



- This switch forcibly turns the drain pump on. When the drain pump trial run switch is turned on, the timer indicator will blink seven times, and no remote signal will be accepted.

#### 11. Float switch



- This is a float type switch that monitors the drain level of drain pan. The switch will be activated and will stop operation if the drain pump is faulty or drain hose is stopped up, disabling drainage, causing the drain level to rise abnormally.
- When the float switch is activated, the timer indicator will flash six times. Note that the float switch will also be activated, disabling operation if the connector of float switch has defective contact or is connected incompletely.



## 12. DC Fan Motor Drive Circuit

MODEL RAD-25QH4, RAD-40QH4

- Fig. 12-1 shows the indoor DC fan motor drive circuit.

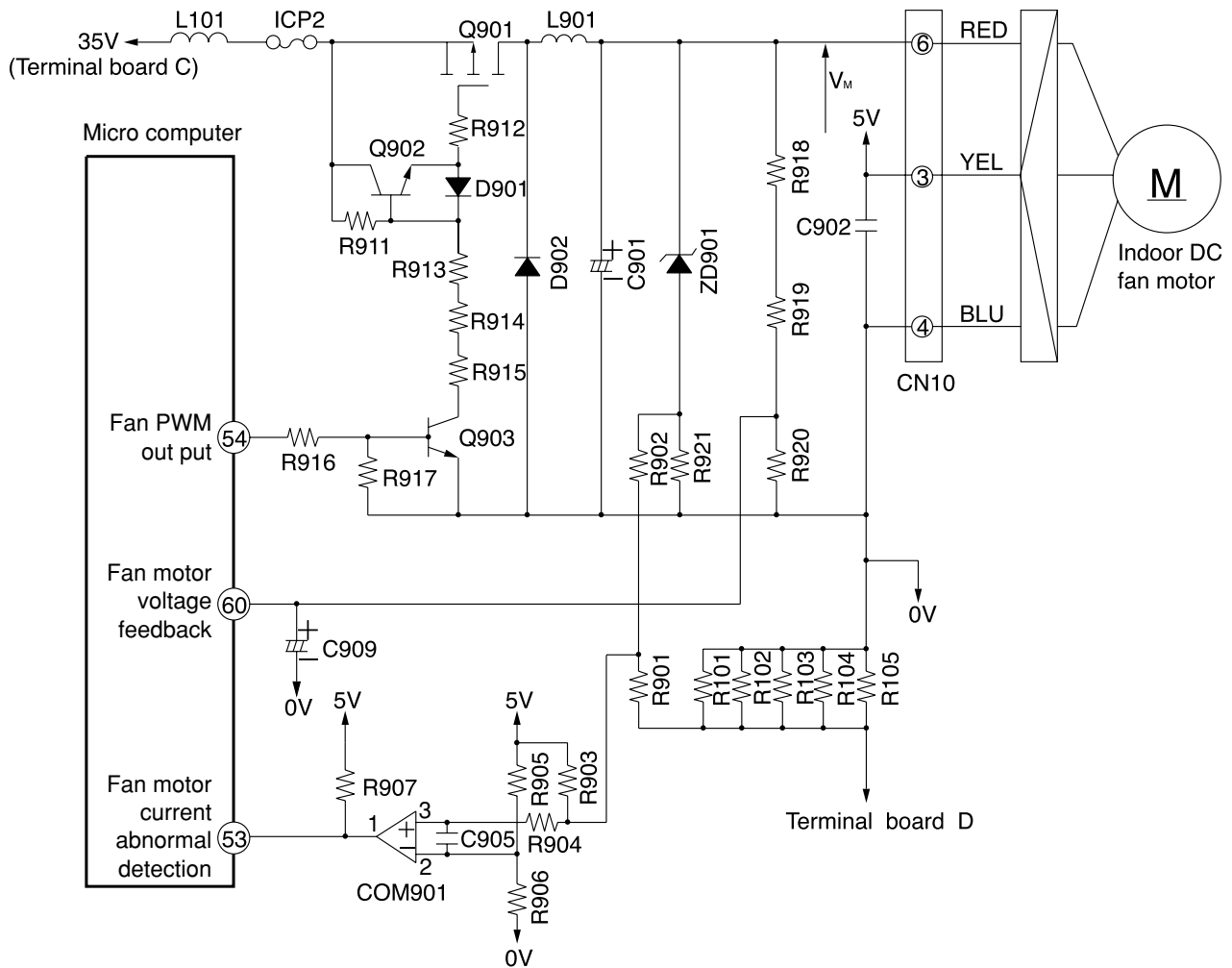


Fig. 12-1

- The circuit produces the fan motor drive voltages, 8-33V, from 35V DC supplied from the outdoor unit and controls the fan motor speed.
- Q901 is switched on and off according to the signal at fan PWM output pin ⑤④ to control the voltage which is smoothed by C901, L901 to drive the fan motor.
- The output voltage is divided by R918, R919 and R920 and is input to divided voltage output pin ⑥①; the micro computer controls the fan PWM output so the output Voltage is set to the specified value. The chopper frequency of the fan PWM output is 15.7kHz.
- The fan current abnormality detector detects the fan motor current using R101-R105 and COM91 determines an overcurrent and outputs it to fan current abnormality pin ⑤③ which is "Hi" during normal operation and "Lo" when overcurrent occurs.
- REG3 supplies 5V DC to the DC fan motor.

13. High static-pressure switch (Full duct type and semi duct type)

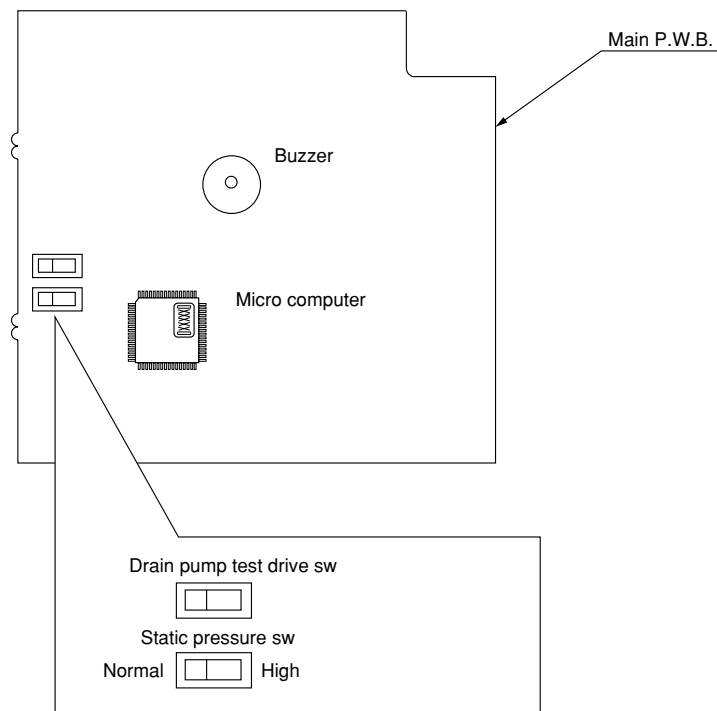


Fig. 13-1

- For full duct type and semi duct type, set the high to HIGH STATIC-PRESSURE.
- If not set to HIGH, there will be reduction of cooling and heating capacities.

## ■ RAM-70QH4, RAM-80QH4

### 1. POWER SUPPLY CIRCUIT

The power supply circuit consists of the circuit (A cycle) corresponds to the indoor units 1 and 2, and the circuit (B cycle) corresponds to the indoor units 3 and 4.

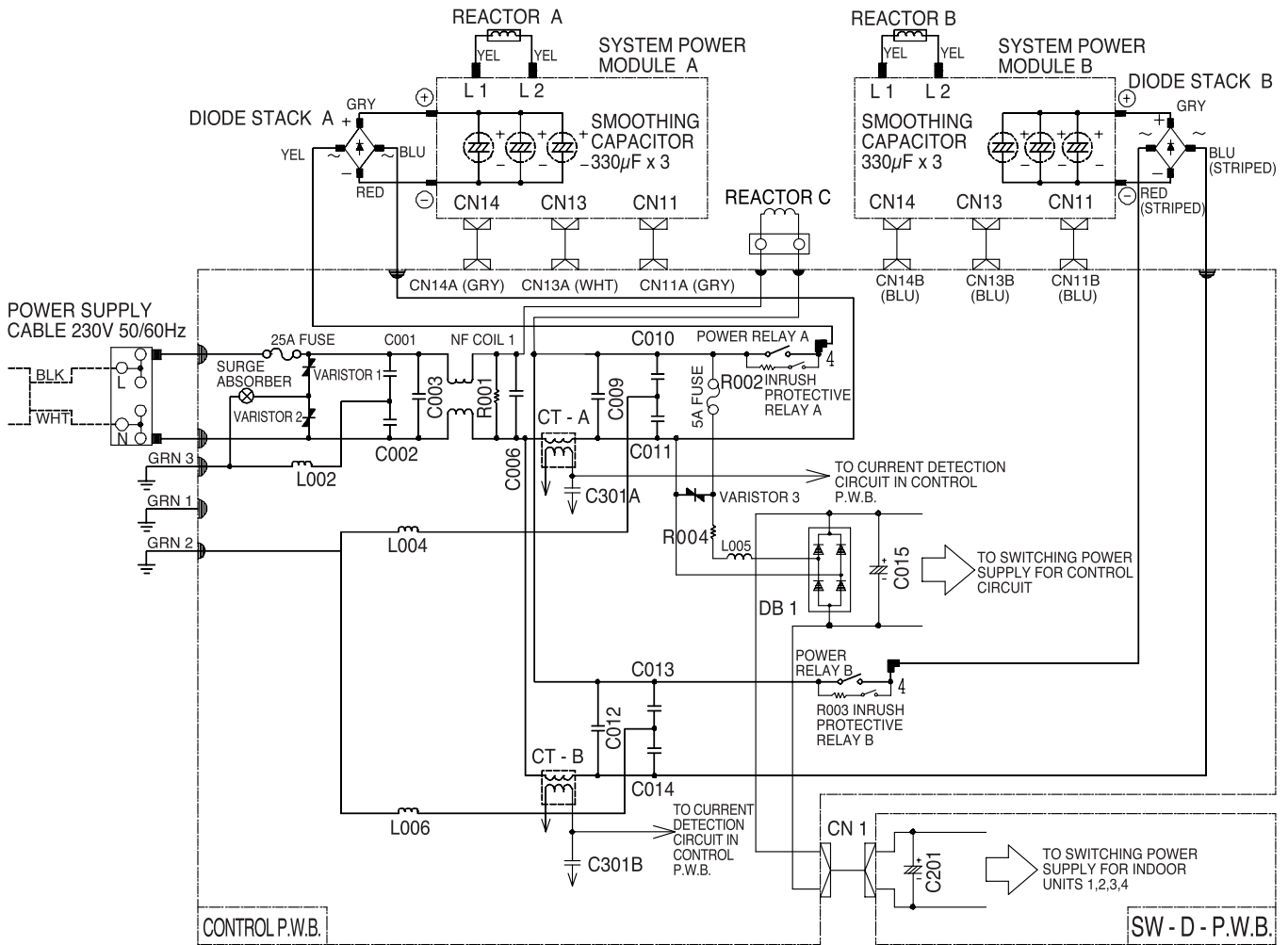


Fig.1-1 Power Supply Circuit

- This circuit works as follows and gets DC voltage: at first, all-wave rectifying  $230 \times \sqrt{2} = 325[V]$  from AC 230V supplied L:N terminals, then, boosting proper DC voltage by the chopper circuit.

But **while the compressor running, the DC voltage turns out approx. 320V-360V.**

- Functions of Main Parts

(1) System Power Module (SPM)

(The module was a new type which joined together old type ACT and POWER modules)

① ACT Module part

The active filter, consists of the reactor and switching element, takes away higher harmonic components contained in the current generated due to the compressor operating, and improves the power factor.

② Power Module

See 3. "Power Module Circuit".

(2) Diode stack A(B) , DB1

The parts rectify the 230V AC supplied terminals L and N to a DC power supply.

< Reference >

- In the case of malfunction or defective connection: Immediately after the compressor starting, it may stop due to "Abnormal low speed" active error etc. And the compressor may continue to operate normally, but the power factor will decrease, the operation current will increase, and the overcurrent breaker of the household power board will probably activate.

< Reference >

- In the case of defective diode stack A(B),: Two situations happen, one of them, the compressor stops to cause "IP" "abnormal low speed", etc. immediately after it starts, and another, it does not operate at all because no DC voltage is generated between (+) and (-) terminals.
- If the diode stack A(B) is faulty. Also, be aware that the 30A fuse might have blown.
- If DB1 is faulty, the compressor does not operated at all because no voltage is generated on the parts of the control P.W.B.
- If DB1 is faulty, be aware that the 5A fuse (or R004) might also have blown.

(3) Smoothing capacitor (C501, C502, C503: 330 $\mu$ F 420V)

The condensers boost up the voltage to be rectified by the diode stuck and smoothes it.

(3) Smoothing capacitor (C015: 270 $\mu$ F 450V, C201: 10 $\mu$ F 450V)

The condensers boost up the voltage rectified by the diode stacks and smoothes it.

Be careful to avoid an electric shock as a high voltage is generated on each part. Also, take care of a short circuit accident due to wrong connections of test equipment terminals, or the P.W.B. may be damaged.

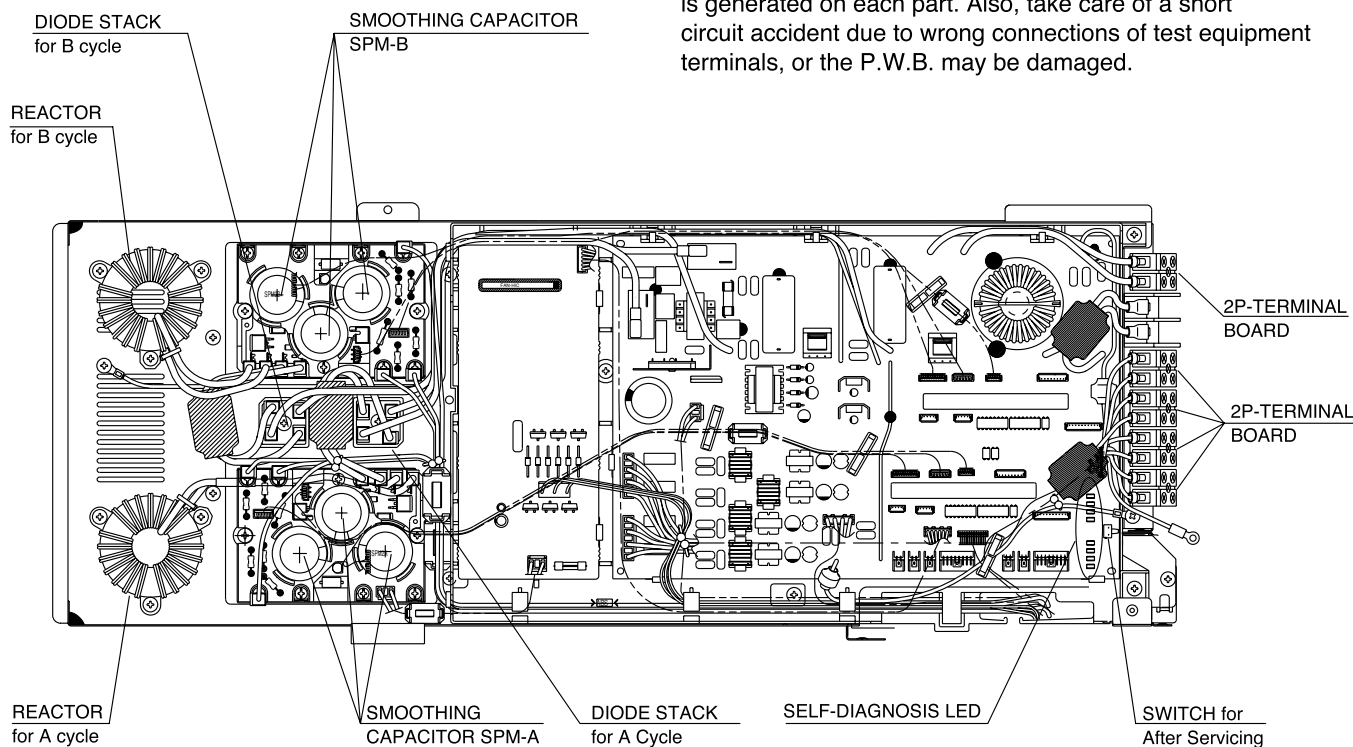


Fig. 1-2

(5) C001-C014, NF COIL 1

These coils absorb electrical noises generated during the compressor is operating and invasive noises entering from L and N terminals, and prevent the electronic parts from them.

※ Be sure to make an earth line for the outdoor unit. If not, the noise filter circuit does not work normally.

※ Be sure to make an earth line for the outdoor unit.  
If not, the surge absorber and varistor 1-3 can not work.

(6) SURGE ABSORBER, VARISTOR 1-3

These electronic parts absorb invasive noises like an inductive thunder.

< Reference >

When the inrush protective resistor is defective, the DB1 may malfunction. As a result, No DC voltage is generated and no operation can be done. In this case, the 5A fuse may blow.

(7) INRUSH PROTECTIVE RESISTOR (R002,R003),  
INRUSH PROTECTIVE RESISTOR (R004)

The resistors work to limit an over current when power is just turned on.

(8) CT

The part detects an electrical current and limits it to be not in excess at high loading.

## 2. Interface Circuit

- The function of the interface circuit is to perform:  
Communications between the indoor and outdoor units by means of superimposing an A.C. signal ( $f=38\text{kHz}$ , amplitude 1V) on the 35V D.C. line supplied from the outdoor unit to the indoor unit.  
The circuit consists of three small circuits and one part as below.  
Oscillator circuit that generates the approx. 38kHz transmitting signal.  
Modulation circuit that composes of an interface signal sent from the micro computer and the  $f=38\text{kHz}$  transmitting signal.  
Demodulation circuit that picks up the interface signal from the communication signal of approx. 38kHz.  
Interface transformer that picks up the interface signal from the 35V D.C. line and superimposes.
- The timing of the interface  
The outdoor unit transmits the REQ signal (request signal to indoor) to the indoor unit one, the indoor unit, after transmitting the REQ signal, transmits the SS signal (the operation order) to the outdoor unit. Then after receiving the order from the indoor unit one, the outdoor unit transmits the REQ signal to the indoor unit two. Similarly, the indoor unit two receives the REQ signal and transmits the SS signal.
- The micro computer in HIC-A (which is for A cycle) controls the indoor unit one and two, the micro computer in HIC-B (which is for B cycle) controls the indoor unit three and four.
- The interface communication between the indoor and outdoor unit in A cycle (one, two) and B cycle (three, four) performs individually. The mutual operation information of A cycle and B cycle is interchanged each other as the inter-micro computer communication.
- The state of the interface communication between the indoor and outdoor unit is under watch. In the case of fault, the self-diagnosis lamp will indicate the state as table 2-1.
- When the interface works normally, measure the voltage (by the indicator style tester with 1V full scale, AC sampling range) between C1D1, C2D2, C3D3, and C4D4 each terminal. The indicator will swing slightly. If the indicator doesn't swing at all, it is likely to have some troubles in the outdoor control P.W.B. interface circuit. However, please accept that the check with the tester is just for a reference value.

Table 2-1

| L L L L<br>D D D D<br>3 3 3 3<br>0 0 0 0<br>1 2 3 4<br>A A A A | L L L L<br>D D D D<br>3 3 3 3<br>0 0 0 0<br>1 2 3 4<br>B B B B | Self-diagnosis name                                  | Trouble items                                                                                             | Main check point                                                                                                                | Example of checking |
|----------------------------------------------------------------|----------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|---------------------|
| □ □ □ □<br>1 blink                                             | □ □ □ □<br>No blink                                            | In and outdoor unit communication error 1 of A cycle | Communication error of indoor unit 1:<br>No communication between indoor unit 1 and outdoor unit          | ① Unconnection to indoor unit 1 ② Indoor parts troubled<br>③ Indoor control P.W.B.                                              | See A               |
| □ □ □ □<br>2 blinks                                            | □ □ □ □<br>No blink                                            | In and outdoor unit communication error 2 of A cycle | Communication error of indoor unit 2:<br>No communication between indoor unit 2 and outdoor unit          | ① Unconnection to indoor unit 2 ② Indoor parts troubled<br>③ Indoor control P.W.B.                                              | See B               |
| □ □ □ □<br>3 blinks                                            | □ □ □ □<br>No blink                                            | In and outdoor unit communication error 3 of A cycle | Communication error of indoor unit 1 and 2:<br>No communication between indoor unit 1 [2] and outdoor     | ① Unconnection to indoor unit 1 and 2 ② CD reverse connection<br>③ Indoor parts ④ SW-D-P.W.B. ⑤ Outdoor control P.W.B.          | See C               |
| □ □ □ □<br>No blink                                            | □ □ □ □<br>1 blink                                             | In and outdoor unit communication error 1 of B cycle | Communication error of indoor unit 3:<br>No communication between indoor unit 3 and outdoor unit          | ① Unconnection to indoor unit 3 ② Indoor parts troubled<br>③ Outdoor control P.W.B.                                             | See A               |
| □ □ □ □<br>No blink                                            | □ □ □ □<br>2 blinks                                            | In and outdoor unit communication error 2 of B cycle | Communication error of indoor unit 4:<br>No communication between indoor unit 4 and outdoor unit          | ① Unconnection to indoor unit 4<br>② Indoor electric parts troubled ③ Outdoor control P.W.B.                                    | See B               |
| □ □ □ □<br>No blink                                            | □ □ □ □<br>3 blinks                                            | In and outdoor unit communication error 3 of B       | Communication error of indoor unit 3 and 4:<br>No communication between indoor unit 3[4] and outdoor unit | ① Unconnection to indoor unit 3 and 4 ② CD reverse connection<br>③ Indoor parts troubled ④ SW-D-P.W.B. ⑤ Outdoor control P.W.B. | See C               |
| □ □ □ □<br>No blink                                            | □ □ □ □<br>9 blinks                                            | Communication error of outdoor micro computers       | No communication between outdoor A cycle micro computer and B cycle micro computer.                       | ① Outdoor control P.W.B.                                                                                                        | —                   |

### (Caution)

In A cycle and B cycle, the communication error is checked independently.

As the examples shown in Table 2-2, it is possible that only one cycle is normal, or another trouble in the other cycle is also indicated.

Table 2-2

| L L L L<br>D D D D<br>3 3 3 3<br>0 0 0 0<br>1 2 3 4<br>A A A A | L L L L<br>D D D D<br>3 3 3 3<br>0 0 0 0<br>1 2 3 4<br>B B B B | Indication example of combined troubles.                                                                   |
|----------------------------------------------------------------|----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| □ □ □ □<br>1 blink                                             | □ □ □ □<br>No light                                            | A cycle: In/outdoor unit communication error 1, B cycle: Normal operation                                  |
| □ □ □ □<br>2 blink                                             | □ □ □ □<br>2 blink                                             | A cycle: In/outdoor unit communication error 2,<br>B cycle: Stop operating because of peak current cut off |
| □ □ □ □<br>2 blink                                             | □ □ □ □<br>1 blink                                             | A cycle: In/outdoor unit communication error 2,<br>B cycle: Communication error 1                          |

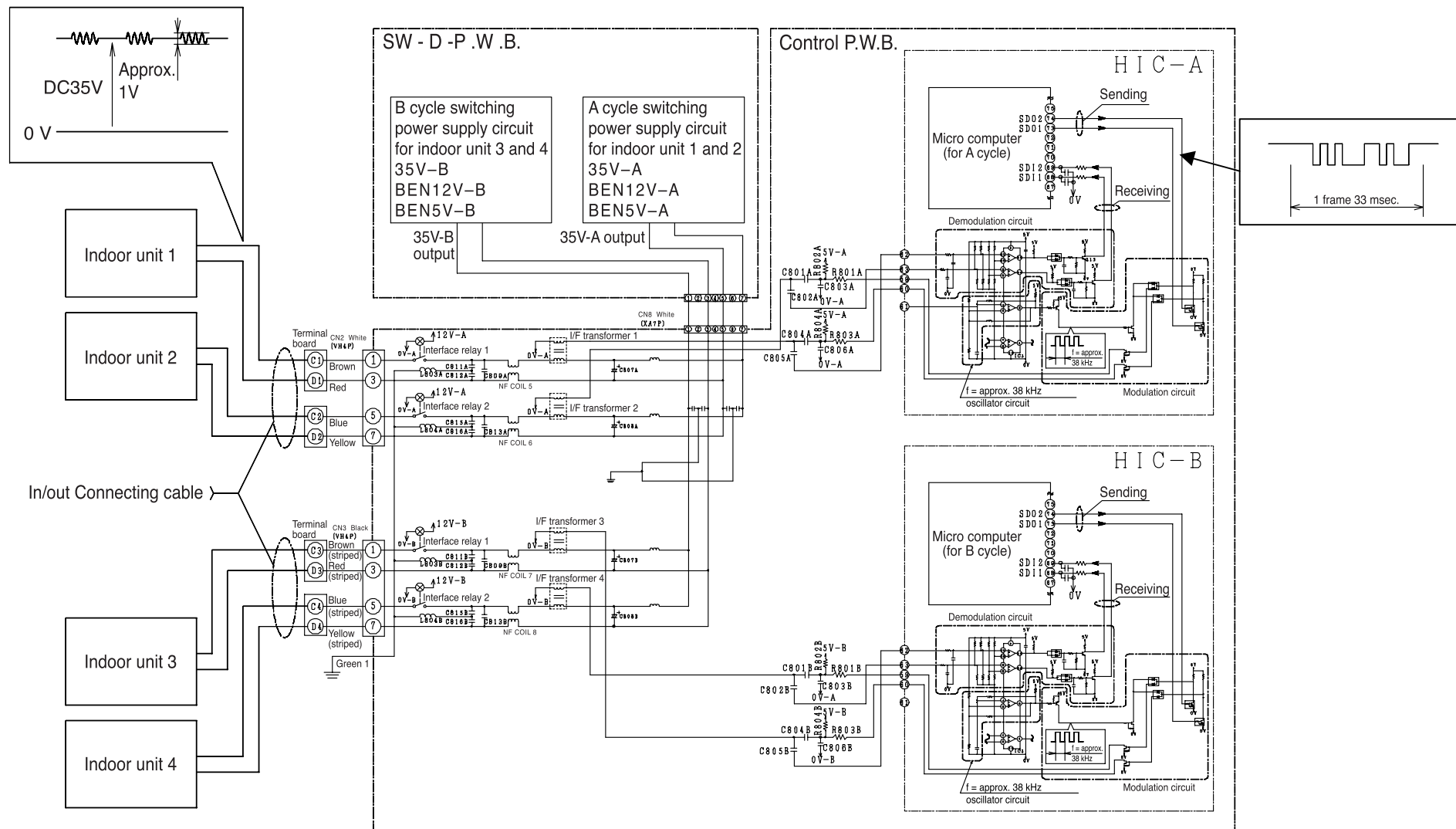


Fig. 2-1 Interface circuit

<Example of checking>

※ Explaining an example of checking for table. 2- 1

(A) : Communication error 1 (LD 303A or LD 303B one time blink)

In the case of the indoor unit 1 (or 3) is in the communication error and the indoor unit 2 (or 4) is normal: At first, check the connections of the in/outdoor connecting cables in the indoor and outdoor units (wrong connection, poor insertion etc).

If being normal state, unplug the power supply (turn off the overcurrent breaker), and remove the in/outdoor connecting cable, then insert the right cable (connected on C2C3 (C4, D4) terminals) into C1D1 (C3, D3) terminals and turn on the power supply (overcurrent breaker). (Connect no cable to C2C3 (C4, D4) terminals.)

If the electric parts of the outdoor unit are normal, "**LD 303A (LD303B) blinks two times**" (because of no connection to C2D2 (C4, D4) terminals), but "LD303A (LD303B) blinks three times," the control P.W.B. of the outdoor unit may malfunction.

※ When replacing C1D1 with C2D2 (C3D3,C4D4), take care of connecting normally, in the case of connecting in reverse, LD303A will blink 3 times and the outlet (35V) falls down to 5V or less (protector operated).

※ When replacing C1D1 with C2D2 (C3D3, C4D4), unplug the power supply (turn off the overcurrent breaker) or the P.W.B. will be damaged.

※ After checking, put back the parts in proper state.

(B) : Communication error 2 (LD303A or LD303B blinks two times)

In the case of the indoor units 2 (or 4) is in the communication error and the indoor unit 1 (or 3) is normal:

As above-mentioned (A), check the connections of the in/outdoor connecting cable in the indoor and outdoor units (wrong connection, poor insertion, etc).

If being normal state, unplug the power supply (turn off the overcurrent breaker ) and remove the cables , then insert the cable connected on C1D1 (C3, D3) into C2D2, and turn on the power supply (overcurrent breaker). (Connect no cable to C1D1 (C3, D3).) If the electric parts of the outdoor unit are normal, "LD 303A (LD 303B) may blink one time" (because of no connection to C1D1 (C3, D3) terminals.), but "LD 303A(LD 303B) blinks 3 times", the control P.W.B. of the outdoor unit may malfunction.

※ Measure a voltage of the 35V-outlet, and take care of connecting in proper state.

(C) : Communication error 3 (LD 303A or LD 303B blinks three times)

In the case of that both the indoor unit 1 and 2 (the indoor unit 3 and 4) are in the communication error: At first, check the connections of "CD reverse" in the indoor and outdoor units, oK or not. If one line of either C1D1 or C2D2 terminals is connected wrongly in CD reverse, "LD 303A blinks three times". Similarly, If one line of either C3D3 or C4D4 is connected wrongly in CD reverse, "LD 303B blinks three times".

※ If CD is connected in reverse , the outlet (35V) falls down to 5V or less (protector operated).

In the case of connecting CD in no reverse, check the voltage between C1D1 and C2D2 (C3D3, C4D4) terminals by the tester. If the voltage is in abnormal , turn off the power supply for a moment, and check the voltage again after removing C1D1 and C2D2 (C3D3, C4D4). but the checked voltage is normal at this time, the indoor unit 1 or 2, or both (unit 3 or 4, or both) malfunction.

For the purpose of determining the units malfunctioned, connect the units one by one and check them at each time. If the 35V outlet is abnormal after removing C1D1 and C2D2 (C3D3, C4D4), "SW-D-P.W.B" is defective. If the 35V outlet is normal, measure the voltages between C1 D1, C2 D2, (C3 D3, C4 D4) each terminal by the indicated tester (with 1V full scale and AC sampling range).

In this just case of indicating the communication error of LD 303A or LD 303B, when the indicator is moving slightly , the HIC of the outdoor unit control P.W.B may be malfunction. (The electric parts of indoor unit are probably not defective because the indoor unit has not short circuit and two of the indoors interface circuit may be not malfunction at same time)

If the indicator does not move at all, the outdoors interface circuit is malfunction.

※ **Remove and insert the connectors, cables and others, after disconnecting the power cord plug from the power supply outlet.**

※ Be aware that the outdoors electric parts, the switching power supply in particular may be defective at leaving CD connection in reverse.



- Fig. 3-1 shows the power module and its peripheral circuit.  
The three transistors on the positive  $\oplus$  side are called the upper arm, and the three transistors on the negative  $\ominus$  side, the lower arm.
- RAM-70QH4 and RAM-80QH4 have two power module circuits as shown in Fig. 3-1 because of providing for two cycles and two compressors style.

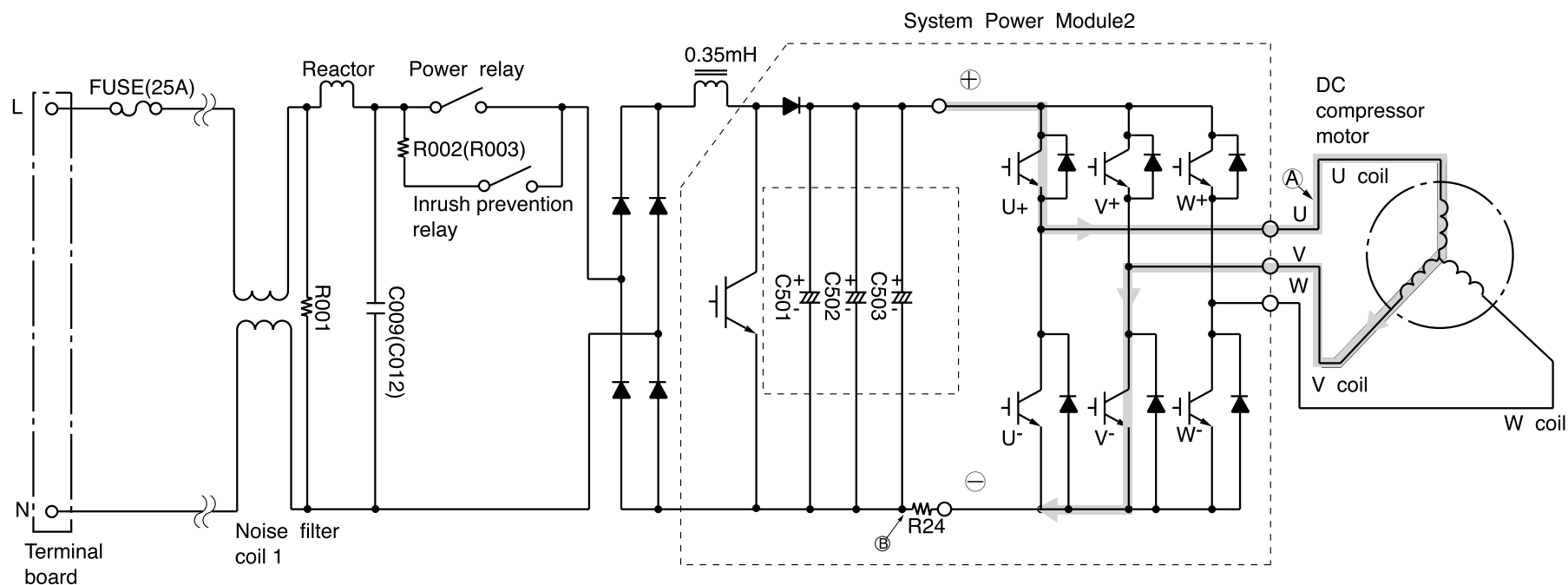


Fig. 3-1 Power module circuit ( $U^+$  is ON,  $V^-$  is ON)

- DC 320-360V is input to power module and power module switches power supply current according to rotation position of magnet rotor. The switching order is as shown in Fig. 3-2.

[ At point E:  $U^+$  is ON,  $V^-$  is ON (circuit in Fig. 3-1)  
At point F:  $U^+$  is chopped (OFF),  $V^-$  is ON (circuit in Fig. 3-4) ]

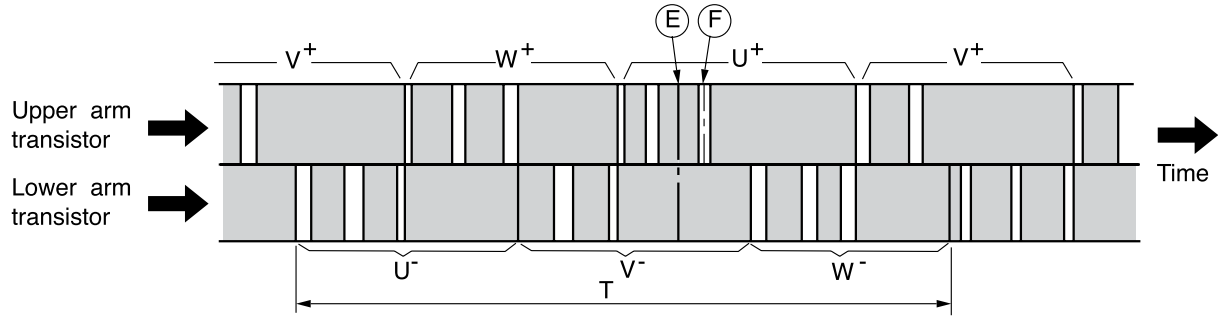


Fig. 3-2 Switching order of power module

- Upper arm transistor is controlled to ON/OFF by 3.2kHz chopper signal. Rotation speed of the compress is proportional to duty ratio (ON time/ ON time + OFF time) of this chopper signal.
- Time T in Fig. 3-2 shows the switching period, and relation with rotation speed (N) of the compressor is shown by formula below;

$$N = 60/2 \times 1/T$$

- Fig. 3-3 shows voltage waveform at each point shown in Fig. 3-1 and 3-4. First half of upper arm is chopper, second half is ON, and first half of lower arm is chopper, second half is ON.

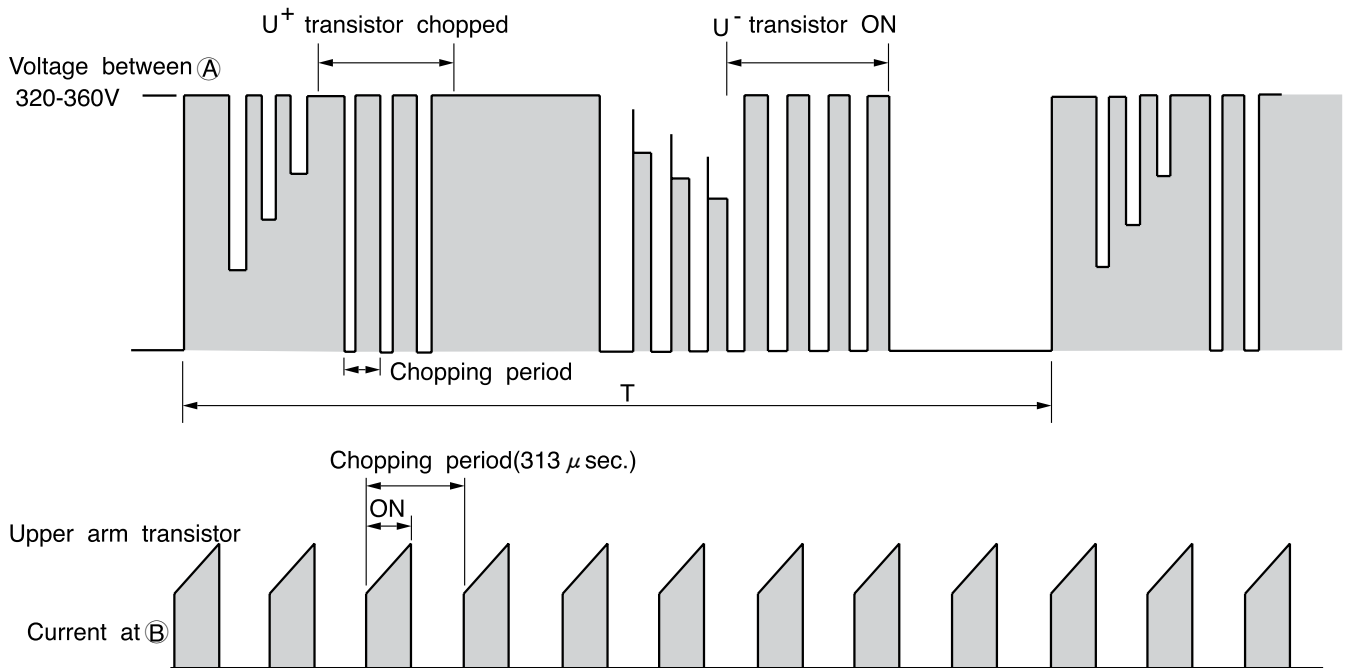


Fig. 3-3 Voltage waveform at each point

- When power is supplied  $U^+ \rightarrow U^-$ , because of that  $U^+$  is chopped, current flows as shown below; ②  
(1) When  $U^+$  transistor is ON:  $U^+ \text{ transistor} \rightarrow U \text{ coil} \rightarrow V \text{ coil} \rightarrow V^- \text{ transistor} \rightarrow \text{DC current detection resistor} \rightarrow \text{Point ②}$  (Fig. 3-1)  
(2) When  $U^+$  transistor is OFF: (by inductance of motor coil)  $U \text{ coil} \rightarrow V \text{ coil} \rightarrow V^- \text{ transistor} \rightarrow \text{Return diode} \rightarrow \text{Point ①}$  (Fig. 3-4)

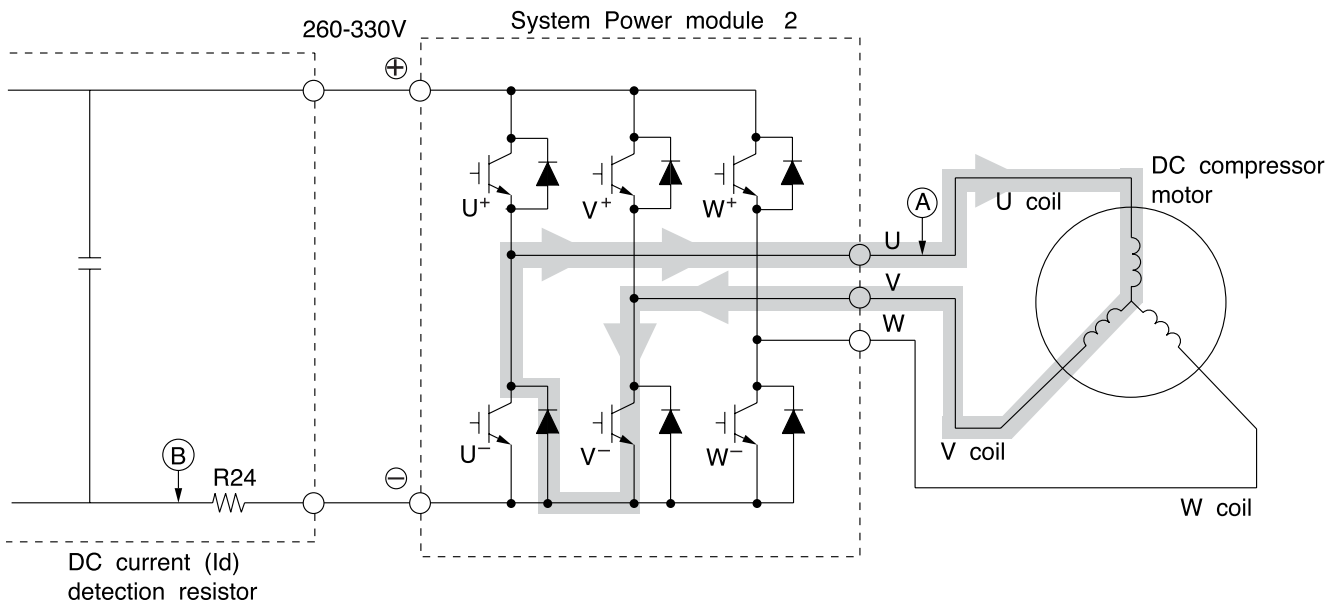


Fig. 3-4 Power module circuit (U<sup>+</sup> is ON, V<sup>-</sup> is ON)

- Since current flows at point B only when U<sup>+</sup> transistor is ON, the current waveform at point B becomes intermittent waveform as shown in Fig. 3-3. Since current at point B is approximately proportional to the input current of the air conditioner, input current is controlled by using DC current (Id) detection resistor.

<Reference>

If power module is defective, self diagnosis lamps on the main P.W.B. may indicate as shown below:

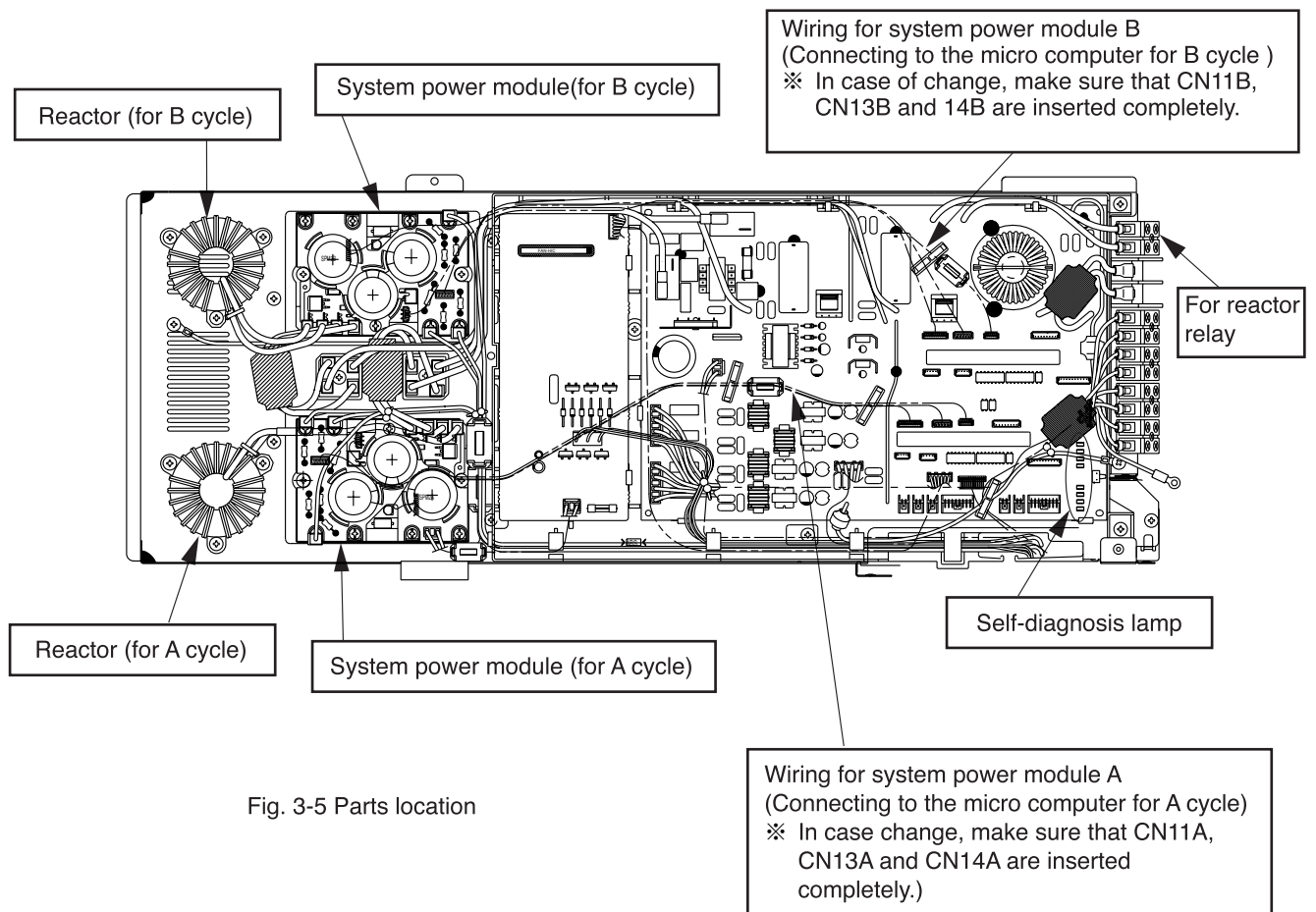


Fig. 3-5 Parts location

#### 4. P.W.B Power Supply Circuit (Switching Power Circuit)

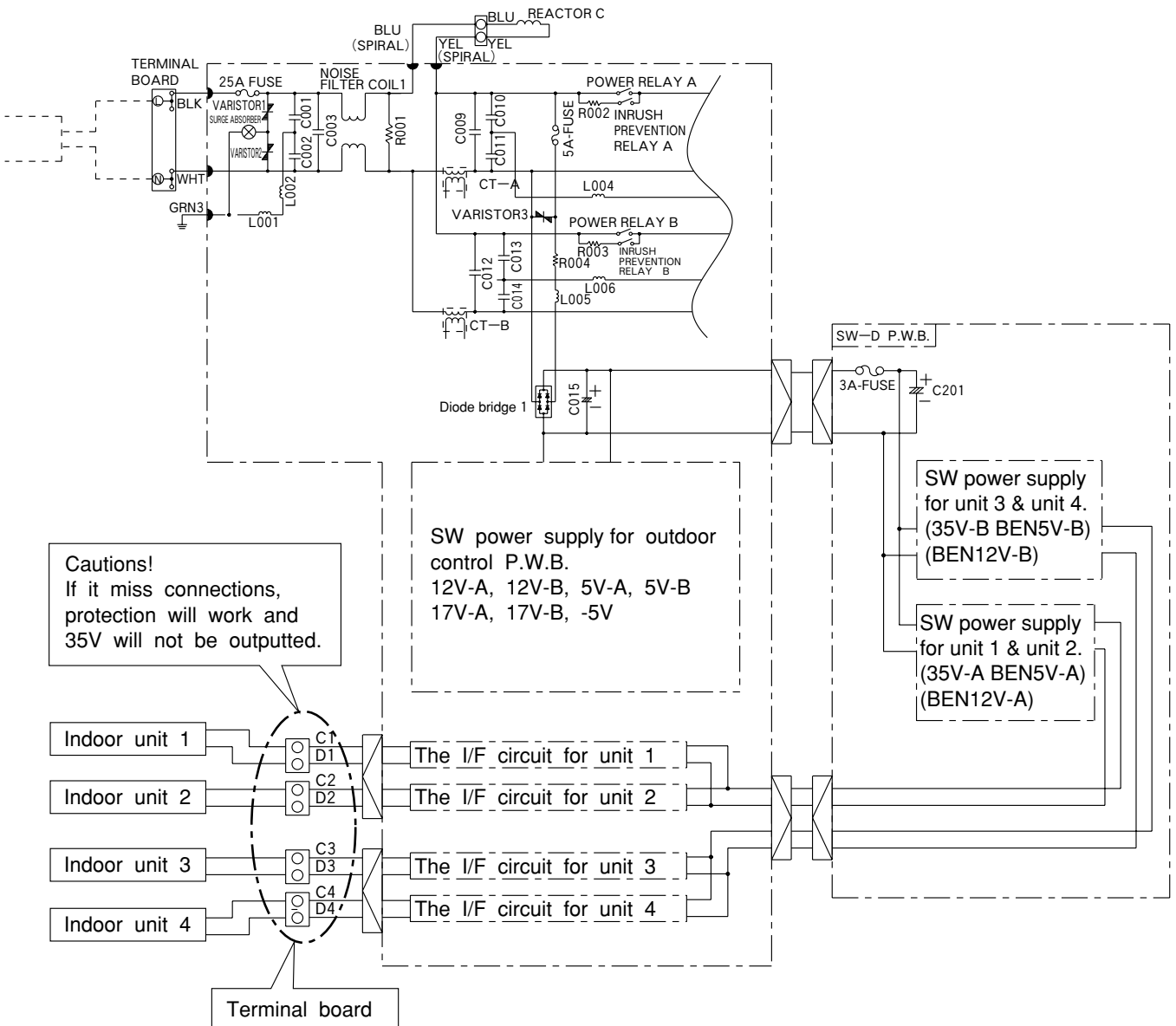


Fig. 4-1 Function of P.W.B. Power Supply Circuit

RAM-70QH4 and RAM-80QH4 have [**SWITCHING POWER SUPPLY CIRCUIT FOR OUTDOOR CONTROL P.W.B.**] (the circuit is in charge of outdoor control power supply entirely) on their control P.W.B. RAM-70QH4 and RAM-80QH4 have [**SWITCHING POWER SUPPLY CIRCUIT FOR INDOOR UNIT**] (the circuit generates 35V power supply for the indoor units of 4 rooms (3 rooms in case of 3 rooms multi) and 12V, 5V, for electric expansion valve control on their SW-D- P.W.B. with 2-circuit.)

The functions of switching power circuit, input DC approx. 325V, which was rectified by the diode bridge DB1, into the primary. Switch the control IC on and off at high speed to generate the voltage in the switching transformer primary winding. Transmit the voltage to the secondary winding through the transformer core. The voltage is generated at each secondary output corresponding to each winding.

(1) Switching power supply circuit for outdoor control P.W.B.

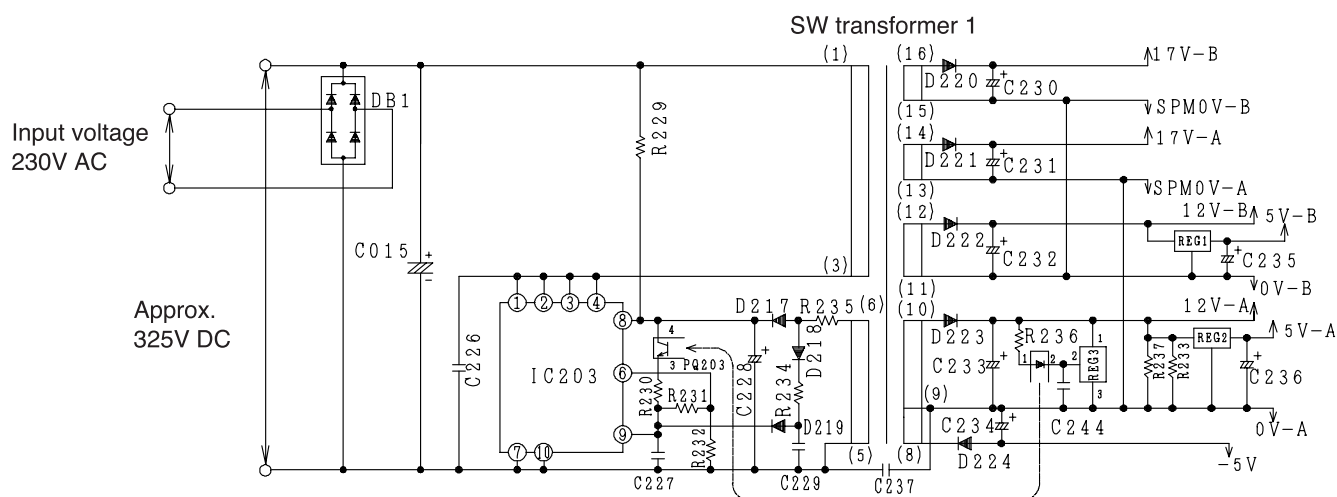


Fig. 4-2 Switching power supply circuit for outdoor control P.W.B.

Fig. 4-2 shows the switching power supply for the outdoor control P.W.B.

The switching power supply for the outdoor control P.W.B. generates the voltage of power supply to control circuits of the outdoor parts.

The following table 4-1 shows the specification of each output voltage.

Table 4-1 Voltage specification

| Output name | Output specification | Main load circuit                                          |
|-------------|----------------------|------------------------------------------------------------|
| 12 V- A     | 12 (+2.0/-1.5)V      | A cycle control system, (Each IC, Relay, Fan HIC)          |
| 12 V- B     | 12 (+2.0/-1.5)V      | B cycle control system, (Each IC, Relay)                   |
| 5 V- A      | 5 ( $\pm$ 0.5)V      | A cycle control system, (Micro computer, Control circuits) |
| 5 V- B      | 5 ( $\pm$ 0.5)V      | B cycle control system, (Micro computer, Control circuits) |
| - 5V        | -4.5 (+2.2/-1.0)V    | Fan HIC (HIC3)                                             |
| 17 V- A     | 17 (+2.0/-1.0)V      | System power module A                                      |
| 17 V- B     | 17 (+2.0/-1.0)V      | System power module B                                      |

In order to check the voltage shown in Table 4-1, measure at output-indicating point with the P.W.B. by tester.

A cycle and B cycle are isolated electrically, so the potentials of 0V are different between A and B.

When you measure the voltage in A cycle <B cycle>, connect the control terminal (usually black) of a tester to V-A <OV-B>.

Take care NOT to get an electric shock in measuring voltage of the circuit. The electric potential (from the earth) of the OV-point is more than 200V. So measuring it is attended by danger.

## (2) Switching power supply for indoor unit

Fig. 4-3 shows the switching power supply circuit for the indoor units.

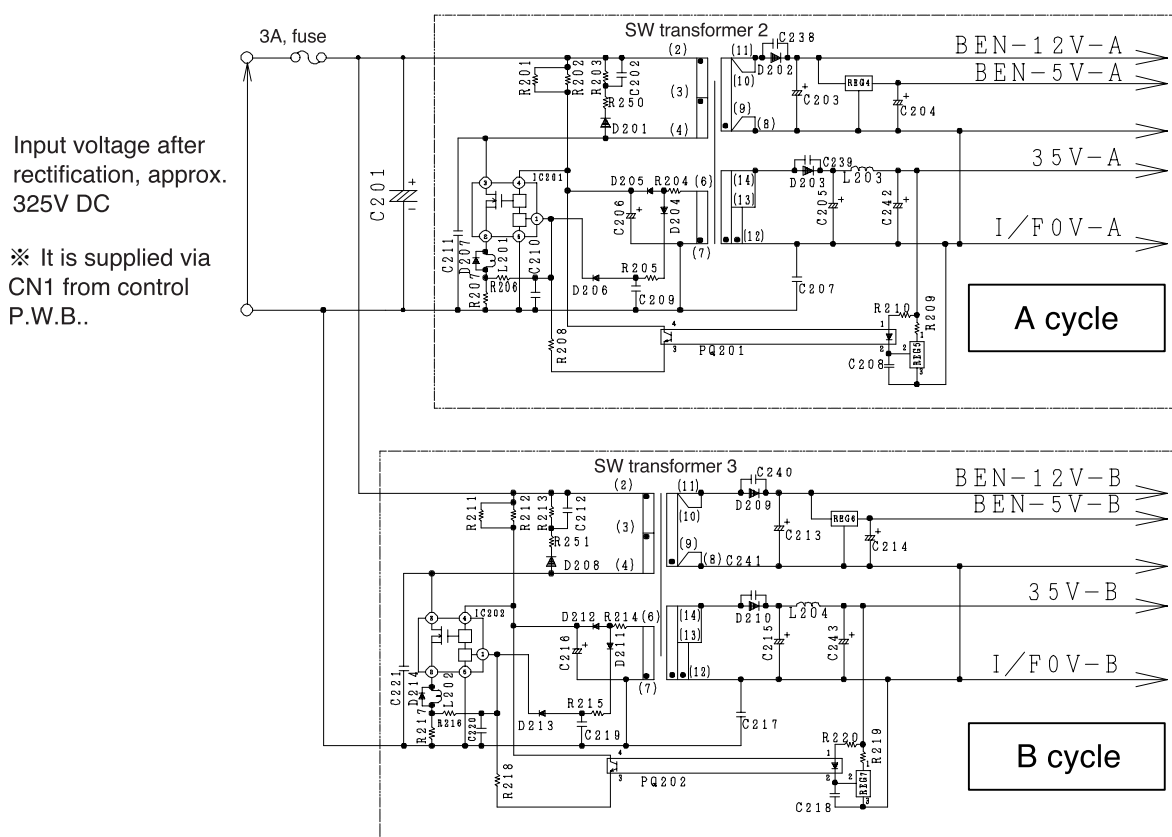


Fig. 4-3 Switching power supply circuit for indoor unit

The switching power supply circuit consists 2 circuits , and is carried on the SW-D-P.W.B.

The circuit for A cycle generates 35V of the power supply voltage for the indoor unit 1・2, and 12V and 5V for the drive of electric expansion valve. Similarly . the circuit for B cycle generates 35V of the power supply voltage for the indoor unit 3・4, and 12V and 5V for the drive of B cycle electric expansion valve. The voltage specification of each output is in fig . 4-2 below.

Fig . 4-2 Voltage specification.

| Output name | Output specification | Main load circuit                                       |
|-------------|----------------------|---------------------------------------------------------|
| 35 V – A    | 35 (± 2.5) V         | Indoor unit 1・2, Reversing valve for A cycle            |
| BEN 12V – A | 12 (± 2.0) V         | Electric expansion valve 1・2 for A cycle                |
| BEN 5V – A  | 5 (± 0.5) V          | Control circuit for electric expansion valve of A cycle |
| 35V – B     | 35 (± 2.5) V         | Indoor unit 3・4 (only unit 3 operates for 3 rooms)      |
| BEN 12V – B | 12 (± 2.0) V         | Electric expansion valve 1・2 for B cycle                |
| BEN 5V – B  | 5 (± 0.5) V          | Control circuit for electric expansion valve of B cycle |

<Reference>

- If the 3A fuse has broken , the switching power circuit is defective. Replace the SW-D-P.W.B..
  - In the case of that the 5A fuse in the control P.W.B has broken.
- (1) If the varistor 3 has broken, the terminal board L/N was supplied a excessive voltage.  
Although the switching power circuit is normal , but have to check the DC voltage that leads to the terminal board L/N terminal, and replace the varistor 3 and 5A fuse.
- (2) If the varistor 3 has not broken , replace the control P.W.B. because the switching power circuit for control P.W.B. is defective.
- In the case of that the indoor unit of A or B cycle does not operate at all:
- (1) If the voltage on the C-D terminals of the in/outdoors connecting cable (check it at the indoor side as near as possible), is normal, Be aware that the electric parts may also be defective.
- (2) If the voltage is abnormal , check C and D of the terminal board in the in and outdoor unit both whether C and D are connected in reverse.  
If they are connected in reverse , the 35V output of the switching power circuit is cut off by a protector . At this time, LD303A (green) or LD303B (green) blinks three times, the cable that has a blinking LED is in reverse connection. (LD303A 3 blinks, C1D1 or C2D2, or both be in reverse connection and LD303B 3 blinks.C3D3 or C4D4, or both be in reverse connection)
- (3) If you have checked that C and D are connect normally, unplug the power supply (turn off the overcurrent breaker) for a moment and remove the in/outdoor connecting cable, then turn on the power supply and check the voltages on C1 and D1, C2 and D2, C3 and D3, C4 and D4 each terminal of the outdoor unit terminal boards.  
If being abnormal, replace the SW-D-P.W.B., but being normal, repair the electric parts because they are defective.
- In the case of the indoor unit 1 and 4 (three rooms multi-type is unit 1-3) does not operate at all:
- (1) Check the connection of the in/outdoor connecting cable whether being in reverse or not )
- (2) If the connections is not reverse,
- ① check the voltage (230V is supplied) on the L and N terminals.
  - ② Replace the SW-D-P.W.B., if the connectors "CN1" and "CN8" leads the SW-D-P.W.B. with the control P.W.B. is connected normally and the self-diagnosis lamp for the outdoor unit lights.
  - ③ Replace the control P.W.B., if the self-diagnosis lamp does not light.

(Caution)

- ※The outdoor unit does not operate at all (above mentioned) means the cases of that the indoor unit indicator, the operation indicator and the louver initializing, at the power supply turning on, can not turn on , equivalent to that the indoor unit is not supplied with the power supply.
- ※When removing the connectors and the in/outdoor connecting cable, unplug the power supply (turn off overcurrent breaker) or the P.W.B. may be damaged.

## 5. Overload control circuit (OVL control circuit)

- Overload control is to decrease the speed of the compressor and reduce the load when the load on the air conditioner increases to an overload state, in order to protect the compressor, electronic components and power breaker.
- Overloads are judgement by comparing the DC current level and set value.
- Fig. 5-1 shows the overload control system configuration and Fig. 5-2 is a characteristic diagram of overload judgement values. There are two judgement methods-external judgement which compares the externally set value with the DC current value regardless of the rotation speed and internal judgement which compares the set value that according to the rotation speed programmed in the micro computer software with the DC current value.

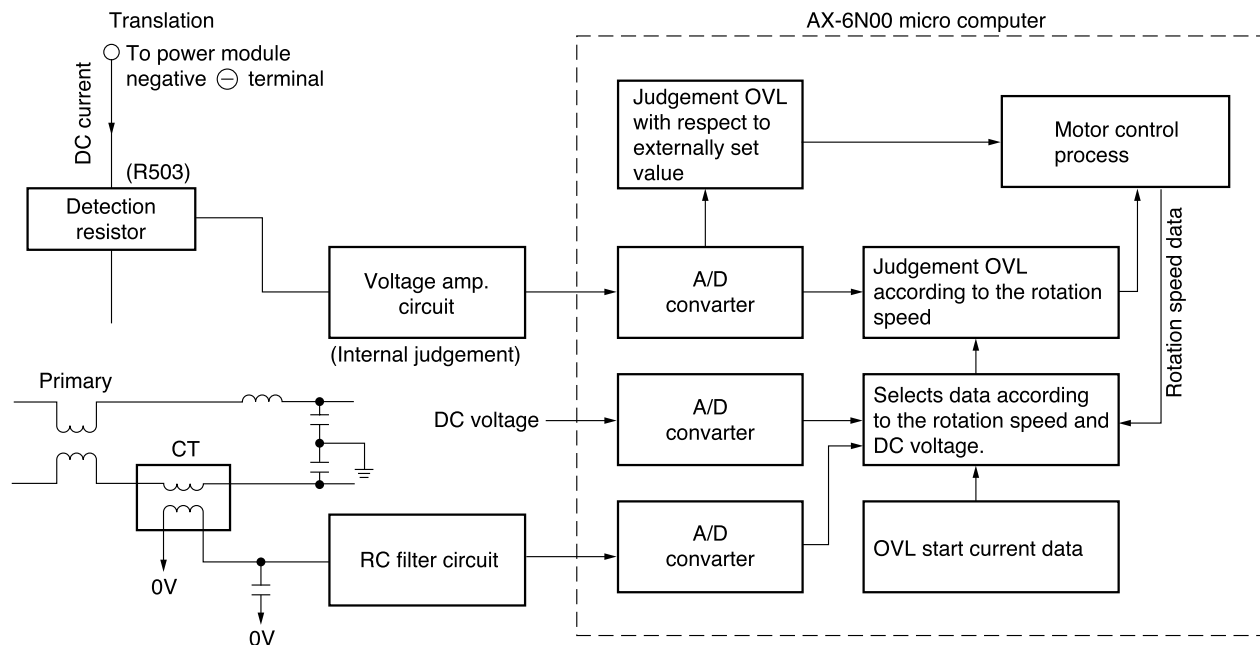


Fig. 5-1 Overload Control System Configuration

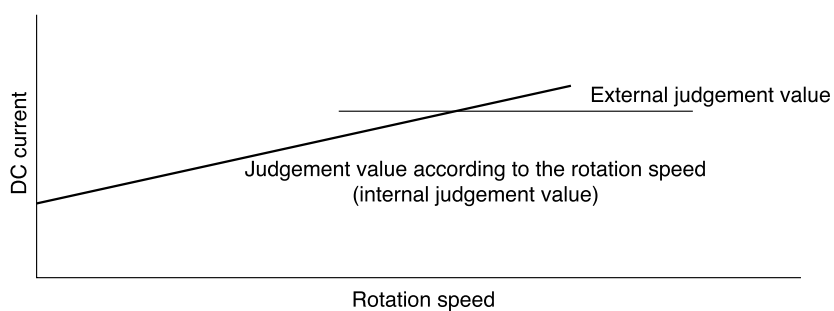


Fig. 5-2



## 6. Temperature Detection Circuit

- The outdoor unit (this model) provides with the outdoor temperature thermistor, DEF (defrost) thermistor, OH (overheat) thermistor and electric expansion valve thermistor so that they detect the temperatures of the unit and control the system.
- The circuit of the thermistors is shown as Fig. 6-1, and their roles and temperature measuring points are shown as Table 6-1. The DEF thermistor, OH thermistor and electric expansion valve are for A cycle and B cycle respectively. The outdoor temperature thermistor is common to A cycle and B cycle.

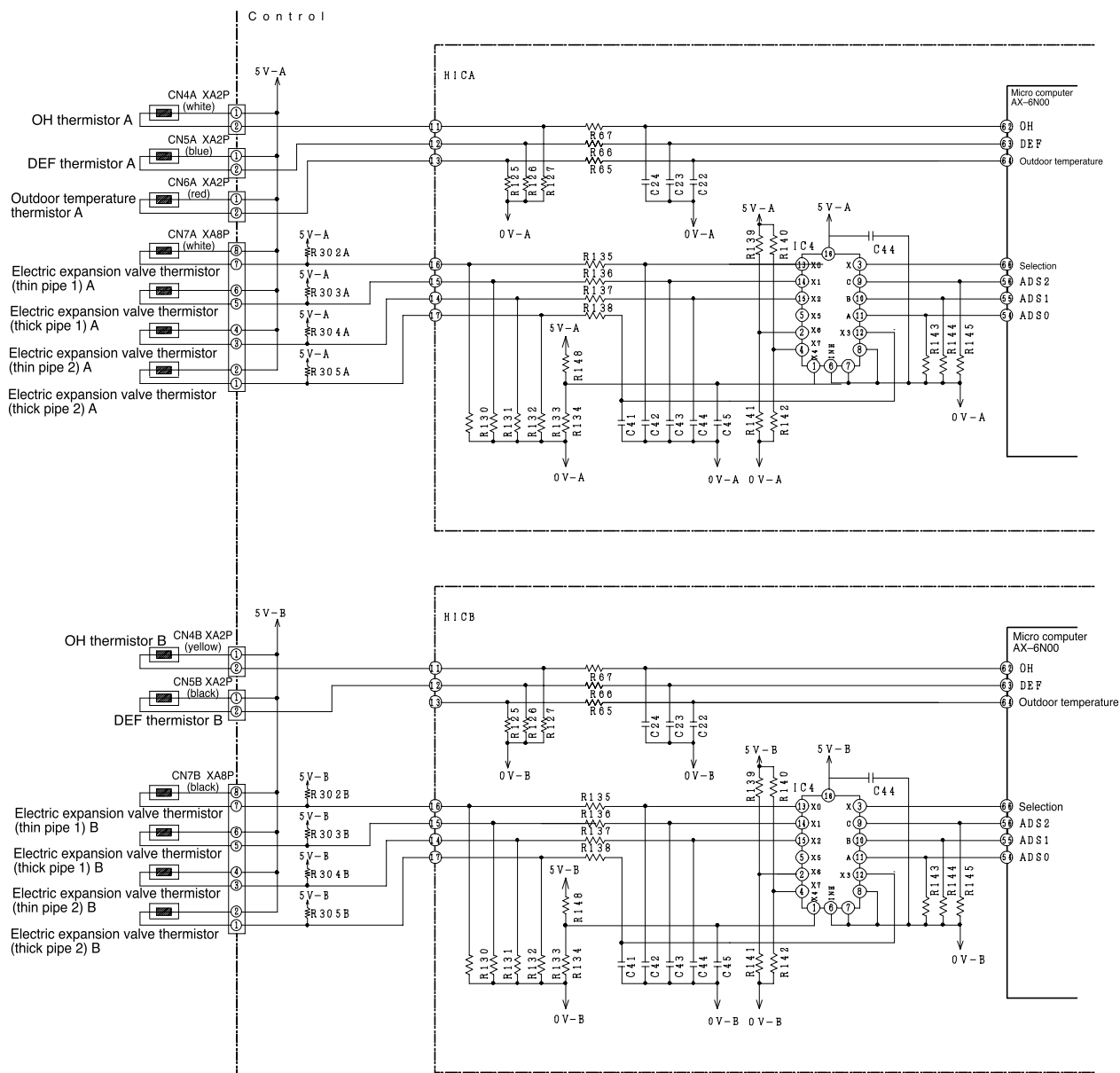


Fig. 6-1 Temperature Detection Circuit

Table 6-1 Name and Role of each thermistor

| Name                                                   | Connector No | Measuring Point            | Role                                                                                                                                                         |
|--------------------------------------------------------|--------------|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| OH thermistor A                                        | CN4A         | A cycle compressor head    | If the temperature of the compressor rises abnormally (118°C), the compressor will be stopped. The temperature is used to decide the operation of the valve. |
| OH thermistor B                                        | CN4B         | B cycle compressor head    |                                                                                                                                                              |
| DEF thermistor A                                       | CN5A         | A cycle heat exchanger     | The thermistors decide the defrost operation during heating combined the data of the outside temperature and its data.                                       |
| DEF thermistor B                                       | CN5B         | B cycle heat exchanger     |                                                                                                                                                              |
| Outdoor temperature thermistor A                       | CN6A         | Outside temperature        | Outdoor temperature is used to decide the various operations of the air conditioner.                                                                         |
| Electric expansion valve thermistor (thin pipe 1) A    | CN7A         | Indoor unit 1 (thin pipe)  | The thermistors detect the temperatures of the piping to the indoor units. The temperatures are used to decide how much the expansion valve is opened.       |
| Electric expansion valve thermistor (thick pipe 1) A   |              | Indoor unit 1 (thick pipe) |                                                                                                                                                              |
| Electric expansion valve thermistor (thin pipe 2) A    |              | Indoor unit 2 (thin pipe)  |                                                                                                                                                              |
| Electric expansion valve thermistor (thick pipe 2) A   |              | Indoor unit 2 (thick pipe) |                                                                                                                                                              |
| Electric expansion valve thermistor (thin pipe 1) B※1  | CN7B         | Indoor unit 3 (thin pipe)  |                                                                                                                                                              |
| Electric expansion valve thermistor (thick pipe 1) B※1 |              | Indoor unit 3 (thick pipe) |                                                                                                                                                              |
| Electric expansion valve thermistor (thin pipe 2) B※1  |              | Indoor unit 4 (thin pipe)  |                                                                                                                                                              |
| Electric expansion valve thermistor (thick pipe 2) B※1 |              | Indoor unit 4 (thick pipe) |                                                                                                                                                              |

※1 Not carried in RAM-70QH4

- Table 6-2 shows the correspondence between the thermistor's resistance and the temperature. They should be used as reference values. The value, which you measure, may be slightly difference from that in the table. It depends on the instrument.
- When you measure the resistance, pull out the connector after turning off the power supply. Pulling out the connector while the power supply is turned on will cause troubles.
- Avoid measuring the voltage at the HIC pins. However if you must measure it, be aware that the basic voltage potentials at HIC pins should be 0V-A in A cycle and 0V-B in B cycle. The voltage may be measured incorrectly when the basic voltage potential is wrong.

Table 6-2 Correspondence between each thermistor's resistance and temperature (reference value)

| Electric expansion valve thermistor<br>DEF thermistor | Temperature | Resistance | HIC pin potential |
|-------------------------------------------------------|-------------|------------|-------------------|
|                                                       | -15°C       | 12.6kΩ     | 1.0V              |
|                                                       | 0°C         | 6.1kΩ      | 1.7V              |
|                                                       | 25°C        | 2.2kΩ      | 3.0V              |
|                                                       | 50°C        | 860Ω       | 3.9V              |
|                                                       | 75°C        | 400Ω       | 4.4V              |
| Outdoor temperature thermistor                        | Temperature | Resistance | Potential         |
|                                                       | -15°C       | 12.6kΩ     | 1.0V              |
|                                                       | 0°C         | 6.1kΩ      | 1.7V              |
|                                                       | 15°C        | 3.2kΩ      | 2.4V              |
|                                                       | 30°C        | 2kΩ        | 3.1V              |
| OH thermistor                                         | Temperature | Resistance | Potential         |
|                                                       | 25°C        | 33.9kΩ     | 0.5V              |
|                                                       | 50°C        | 10.8kΩ     | 1.3V              |
|                                                       | 75°C        | 4.1kΩ      | 2.4V              |
|                                                       | 100°C       | 1.7kΩ      | 3.4V              |
|                                                       | 105°C       | 1.5kΩ      | 3.6V              |
|                                                       | 118°C       | 1kΩ        | 3.9V              |

- When the connectors of the thermistors are disconnected or the thermistors is open or short, LD301A (red) lights and LD302A (orange) blinks so that they indicate troubled parts. Combinations of LD301A and LD302A, LD301B and LD302B are set up for indicating troubled thermistors of A cycle and B cycle each. The correspondences between the number of blink time and troubled parts are shown as Table 6-3. Look in the table (LD301 and LD302 blink) for troubled parts, and if the disconnections of them are checked out, they are replaced.
- If you can see two or more troubled thermistors in one cycle by the table, a small number of blink takes precedence of others. (When the thermistors of A and B cycle are troubled at the same time, LD301A and LD301B light, and LD302A and LD302B blink.)
- The electric expansion valve thermistor is put together with 4 pieces, when replacing the thermistor, replace one set of 4 pieces as taking care of positioning. If you don't do so, the unit may not operate normally and its cooling and heating performance may drop.
- Be aware that only an open-circuit for OH thermistor has to be checked in 5 minutes after the compressor starts.
- If the unit operates abnormally after replacing the thermistor, replace the control P.W.B. because it malfunctions.

Table 6-3 LED lighting mode at the thermistors troubled

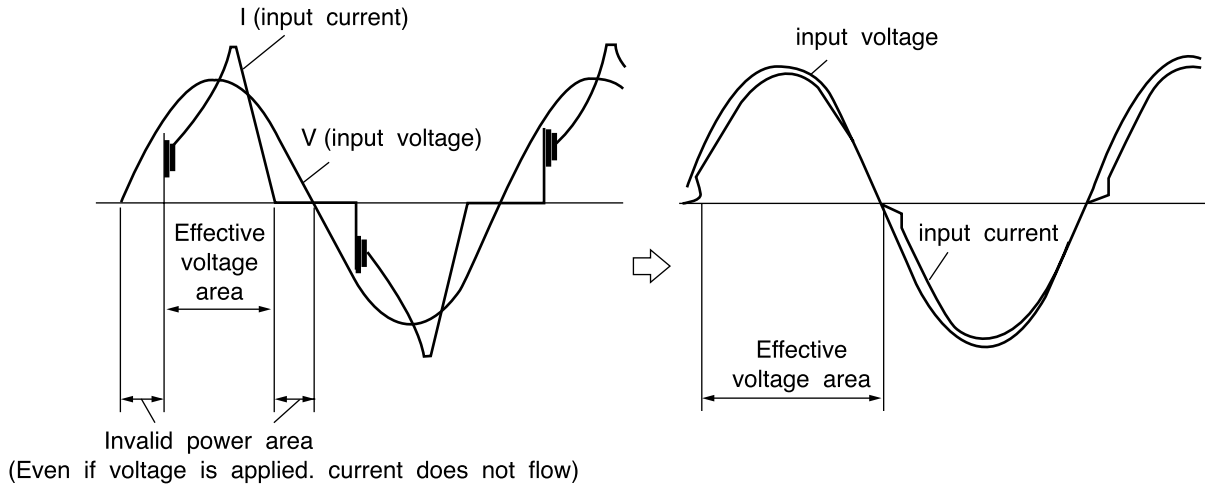
| LED lighting mode |          | Troubled thermistor                                  | Judgement     |               |
|-------------------|----------|------------------------------------------------------|---------------|---------------|
| LD301A            | LD302A   |                                                      | Open          | Short         |
| Lights            | 1 blink  | OH thermistor A                                      | 0.04V or less | 4.96V or more |
| Lights            | 2 blinks | DEF thermistor A                                     | 0.04V or less | 4.94V or more |
| Lights            | 3 blinks | Outdoor temperature thermistor                       |               |               |
| Lights            | 4 blinks | Electric expansion valve thermistor (thin pipe1) A   |               |               |
| Lights            | 5 blinks | Electric expansion valve thermistor (thick pipe1) A  |               |               |
| Lights            | 6 blinks | Electric expansion valve thermistor (thin pipe 2) A  |               |               |
| Lights            | 7 blinks | Electric expansion valve thermistor (thick pipe 2) A |               |               |
| LD301B            | LD302B   |                                                      |               |               |
| Lights            | 1 blink  | OH thermistor A                                      | 0.04V or less | 4.96V or more |
| Lights            | 2 blinks | DEF thermistor A                                     | 0.04V or less | 4.94V or more |
| Lights            | 4 blinks | Electric expansion valve thermistor (thin pipe1) B   |               |               |
| Lights            | 5 blinks | Electric expansion valve thermistor (thick pipe1) B  |               |               |
| Lights            | 6 blinks | Electric expansion valve thermistor (thin pipe 2) B  |               |               |
| Lights            | 7 blinks | Electric expansion valve thermistor (thick pipe 2) B |               |               |

- The OH thermistors are detecting the compressor head temperatures. If the temperature rises over 118°C, the compressor in the cycle will be stopped to protect itself and LD301 will blink 6 times (OH STOP). When the compressor temperature falls under 105°C, the compressor will restart. During OH STOP, the fan continues to spin. The other cycles without a trouble operates normally.
- If OH STOP often occurs, the refrigerant may be leaking.

## 7. Power Factor Control Circuit

Power factor is controlled by almost 100%. (Effective use of power)

With IC in ACT module, control is performed so that input current waveform will be similar to waveform of input voltage.

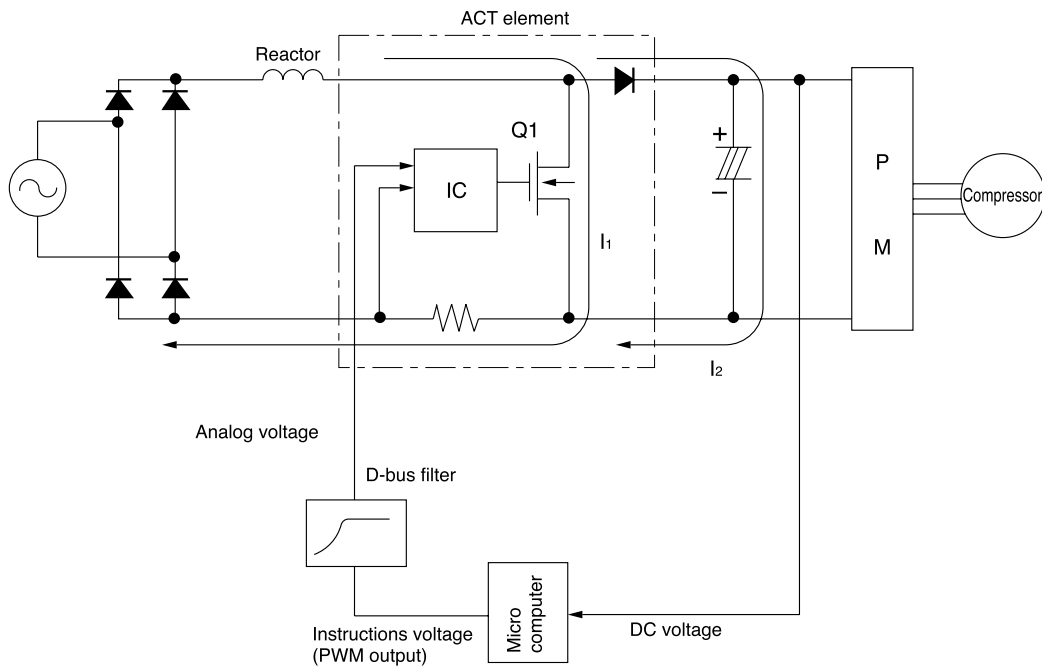


\*Assuming the same current capacity (20A), power can be used about 10% effective, comparing with current use (power factor of 90%), and maximum capacity is thereby improved.

(1) Boosting and varying DC voltage  $V_d$

It boosts the DC voltage to the valve corresponds to the rotation speed with a detected DC voltage by the micro computer.

Its component is basically made of a boosting chopper circuit.

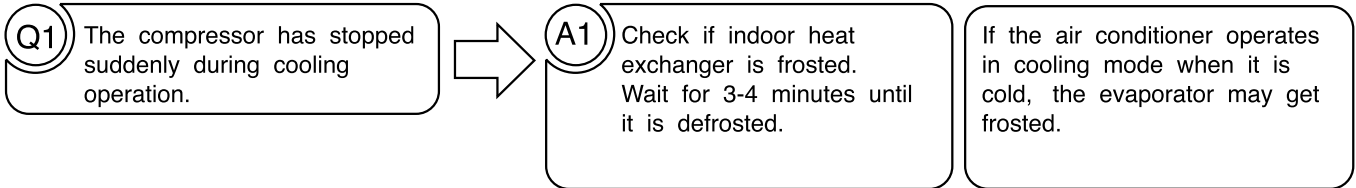


The current  $I_1$  is absorbed into the reactor for On time and discharged to the capacitor for Off time with high frequency chopping. ( $I_2$ )

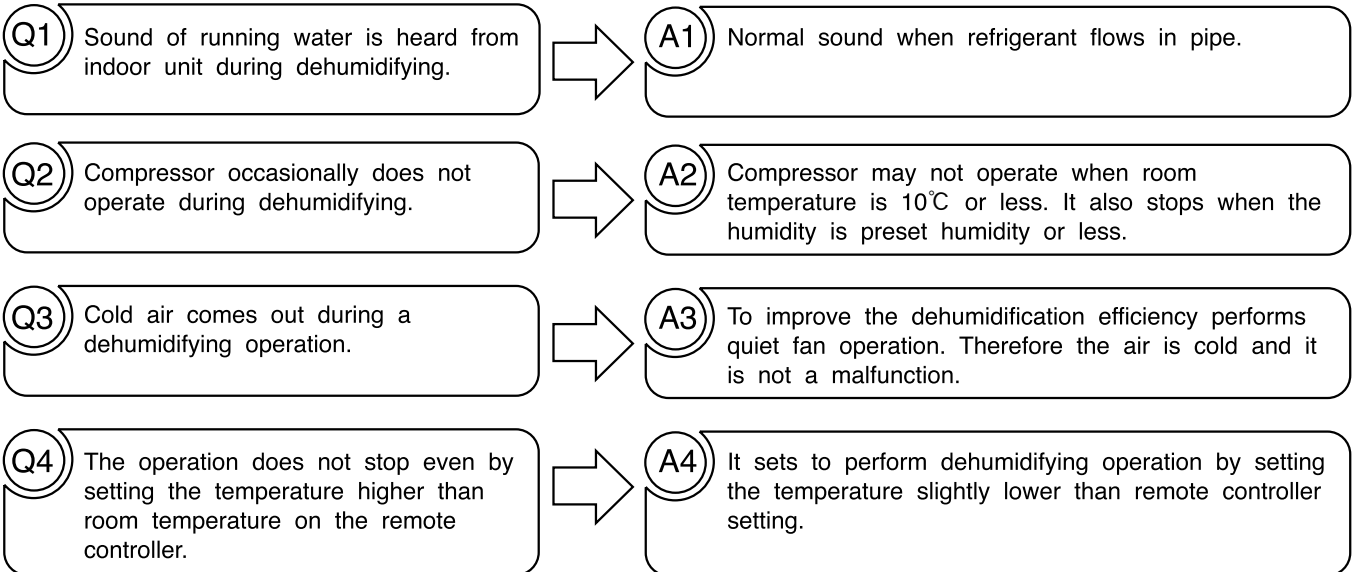
It controls a chopper duty of Q1 so that a current be absorbed into the reactor and a current be consumed by the inverter are balanced. At high loading, DC voltage is boosted as many duties (absorbing current much).

## SERVICE CALL Q&A

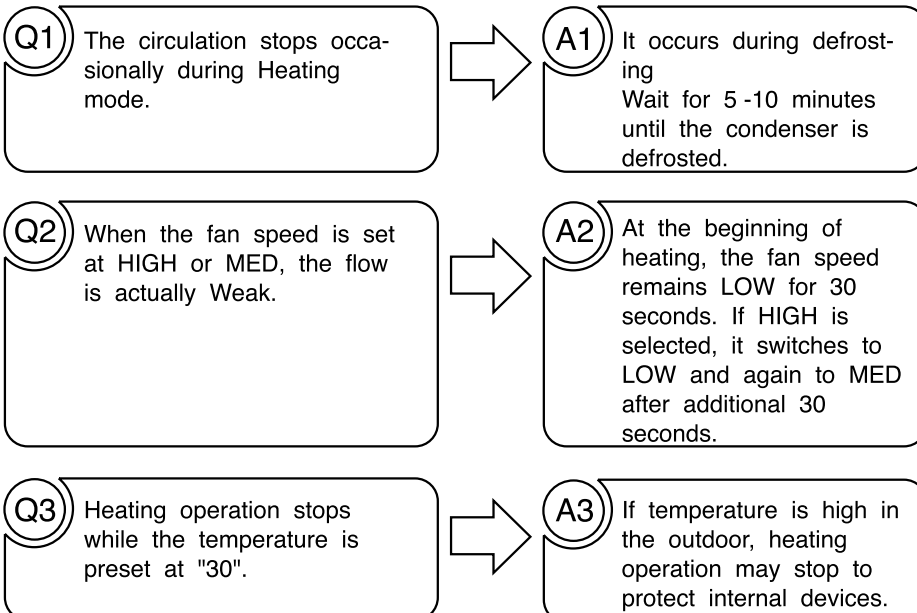
### COOLING MODE



### DEHUMIDIFYING MODE



### HEATING MODE



## AUTO FRESH DEFROSTING

**Q1** After the ON/OFF button is pressed to stop heating, the outdoor unit is still working with the OPERATION lamp lighting.



**A1** Auto Fresh Defrosting is carried out : the system checks the outdoor heat exchanger and defrosts it as necessary before stopping operation.

## AUTO OPERATION

**Q1** Fan speed does not change when fan speed selector is changed during auto operation.



**A1** At this point fan speed is automatic.

**Q2** How is the automatic operation mode determined?



**A2** According to the room temperature and outside temperature, heating or cooling or dehumidifying operation is automatically selected. Refer to the basic operation section.

**Q3** The room temperature cannot be controlled at an automatic operation.



**A3** It is automatically set as follows.  
At cooling: Set at 27°C  
At dehumidifying: Set slightly lower than room temperature  
At heating: Set at 23°C  
The room temperature setting can be raised 3°C by “\_” or lowered 3°C by “∇”.

## AT STARTING OPERATION

**Q1** When only the power switch is turned on, the damper at the bottom air outlet moves even if the START/STOP button is not pressed. (RAF-25NH4, 50NH4)



**A1** To ensure correct opening and closing of the damper, the damper will move when power is turned on or the unit is to be operated in order to check its fully opened and closed positions.

**Q2** When the heating operation is started, the indoor fan does not start immediately and the damper at the bottom air outlet occasionally does not open.



**A2** This is because the preheating device is working. It will not start to drive the fan until the refrigerating cycle warms up and warm air blows. Wait for a while. The damper does not open either during preheating or for one minute after preheating is finished.

**Q3** When the unit built behind the gallery (lattice door) is to be started immediately after it has stopped, the unit occasionally will not start.



**A3** Such a phenomenon may occur with built-in installation where heat is likely to be stuffy. Install the unit as near to the lattice door as possible so that air is not short-circuited, or provide a partition between the unit and lattice door.

## OTHERS

**Q1** The indoor fan varies among high air flow, low air flow and breeze in the auto fan speed mode. (Heating operation)



**A1** This is because the cool wind prevention function is operating, and does not indicate a fault.

The heat exchanger temperature is sensed in the auto fan speed mode. When the temperature is low, the fan speed varies among high air flow, low air flow and breeze.

**Q2** Loud noise from the outdoor unit is heard when operation is started.



**A2** When operation is started, the compressor rotation speed goes to maximum to increase the heating or cooling capability, so noise becomes slightly louder. This does not indicate a fault.

**Q3** Noise from the outdoor unit occasionally changes.



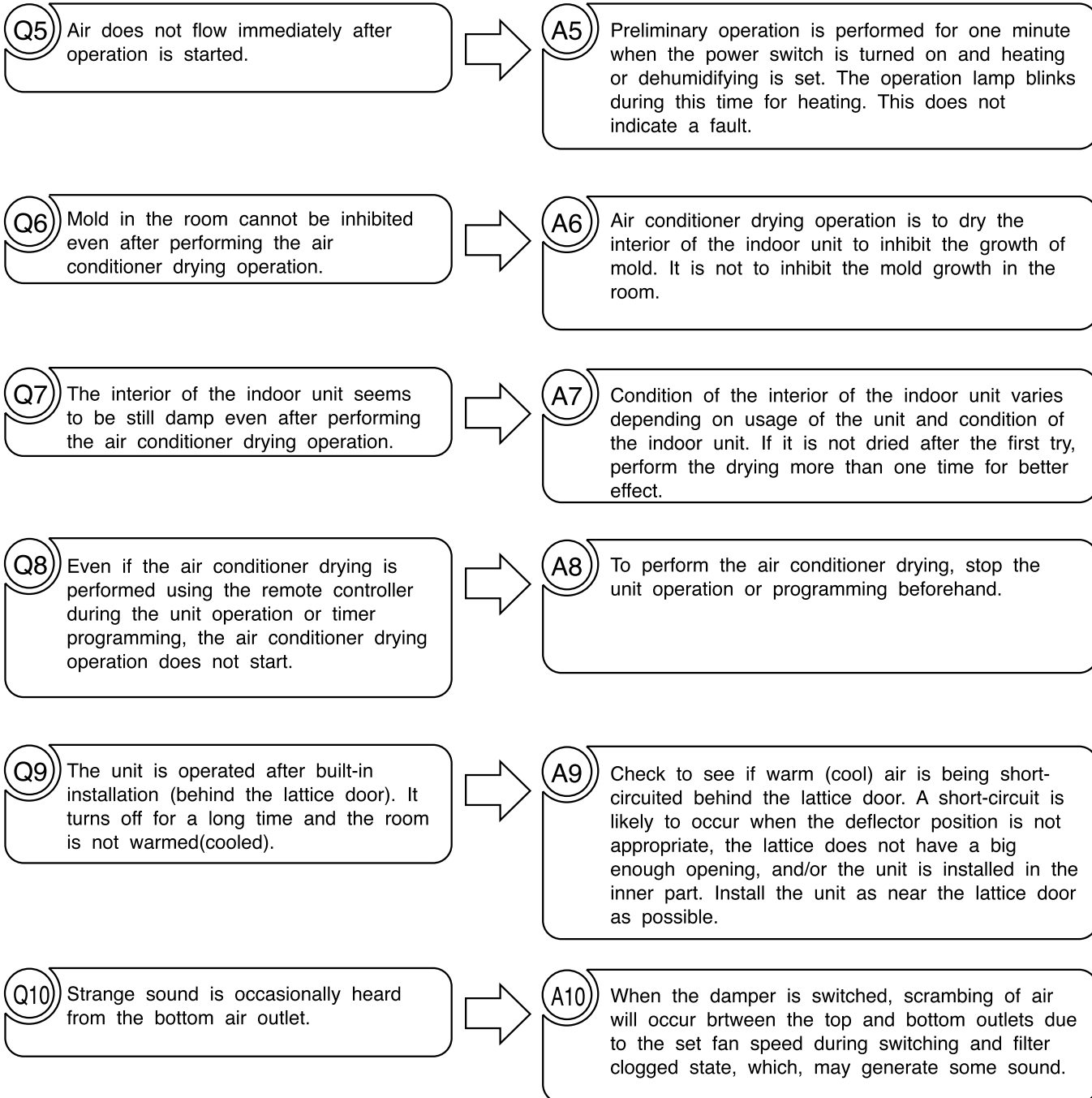
**A3** The compressor rotation speed changes according to the difference between the thermostat set temperature and room temperature. This does not indicate a fault.

**Q4** There is a difference between the set temperature and room temperature.



**A4** There may be a difference between the set temperature and room temperature because of construction of room, air current, etc. Set the temperature at a comfortable level for the space.





## DISASSEMBLY AND REASSEMBLY

MODEL RAF-25NH4, RAF-50NH4

### 1. AIR FILTER

Clean the air filter, as it removes dust inside the room.

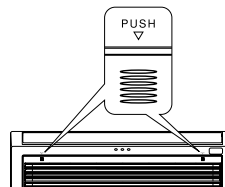
Be sure to clean the filter once every two weeks so as not to consume electricity unnecessarily.

#### PROCEDURE

1

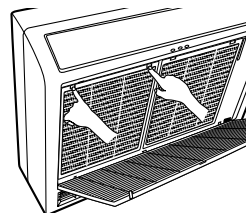
##### Open the front panel.

- To open the front panel, use the remote controller to stop unit operation. Then press the two “≡” sections below PUSH at the top left and right corners of the front panel.
- Grasp the left and right sides of the front panel and open it toward you.



2

##### Remove the filters.



3

##### Remove dust of the filters using a vacuum cleaner.

- After using neutral detergent, wash with clean water and dry in shade.

4

##### Attach the filters.

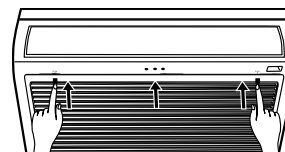
- Attaching the filters which are placed the surface written “FRONT” up.



5

##### Close the front panel.

- To close the front panel, press the two “≡” sections below PUSH at the top left and right corners of the front panel.
- Press the upper center part of the front panel to close properly.



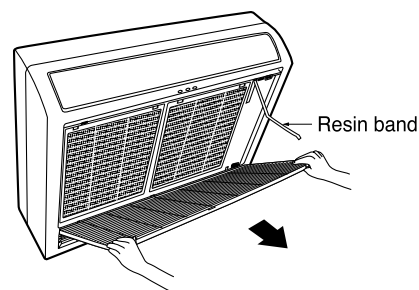
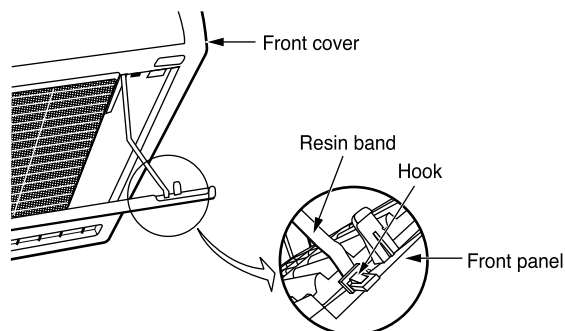
### 2. FRONT PANEL

- Be sure to use both hands to grasp the front panel when removing it or attaching it.
- The front panel may be installed up or down to suit user preference.

#### Removing

- ① Press the hook found at the tip of the resin band installed inside the front panel's right section to remove the resin band.

- ② Pull the front panel down toward you and once fully open, pull it to remove.



#### Attaching

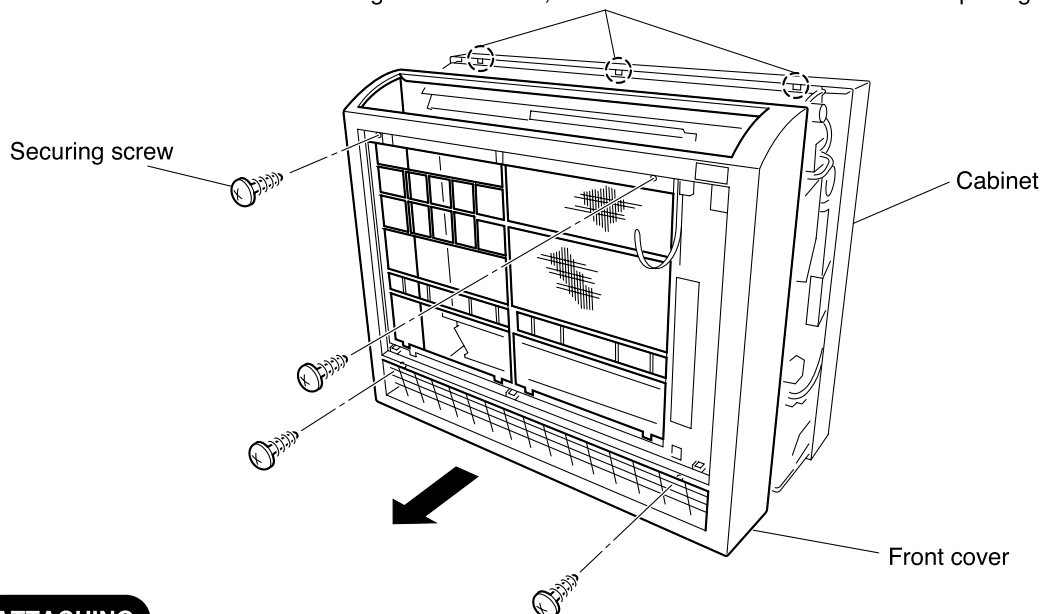
- ① Attach three front panel bearings to the axis of the front cover.

- ② Insert the tip of the resin band into the hole of the protrusion inside the right section of the front panel.

### 3. FRONT COVER

Remove the four securing screws of the front cover, and then pull the front cover towards you.

When attaching the front cover, insert the front cover tabs into these openings.

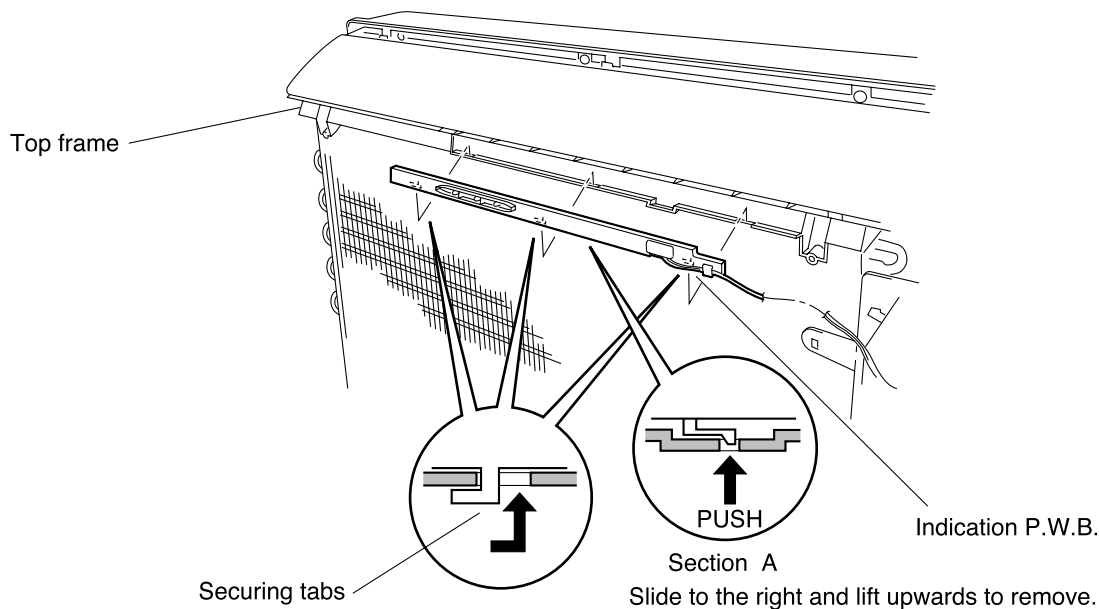


#### ATTACHING

When attaching the front cover, fit the three tabs on the top of the front cover so that they enter the openings on the top frame (insert from a slightly raised position). Be sure that the tabs are inserted correctly.

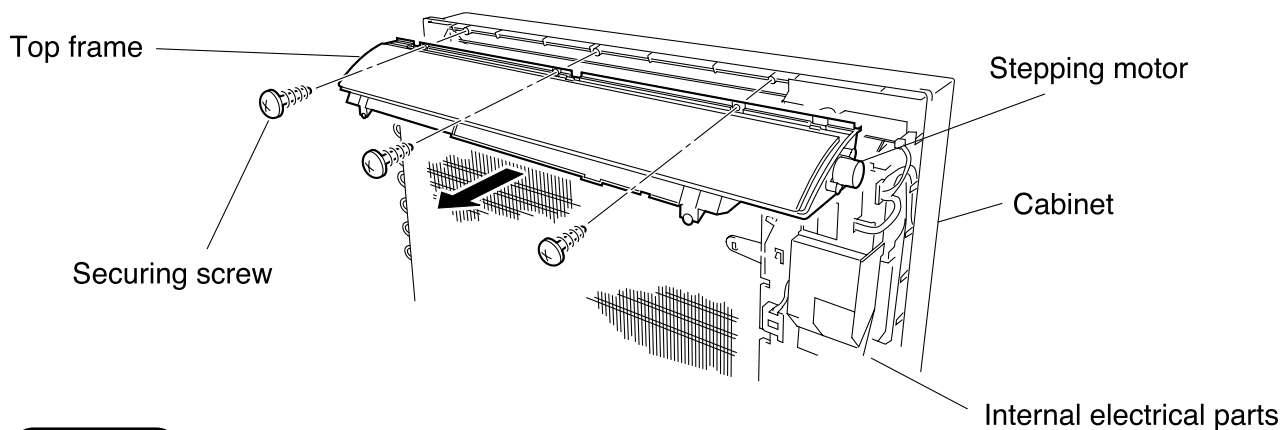
### 4. INDICATION P.W.B.

- (1) Use a screwdriver or other such tool to push up the tabs of the section A from below, and remove.
- (2) As shown in the following diagram, slide the L-shaped tab on the indication P.W.B. to the right so that it enters the hole in the top frame. You can then remove the indication P.W.B. by pulling upwards.



### 5. TOP FRAME

- (1) Remove the front panel, and then remove the front cover.
- (2) Remove the indication P.W.B..
- (3) Remove the cord from the stepping motor of the air deflector.
- (4) Remove the three securing screws of the top frame, and pull the frame towards you.

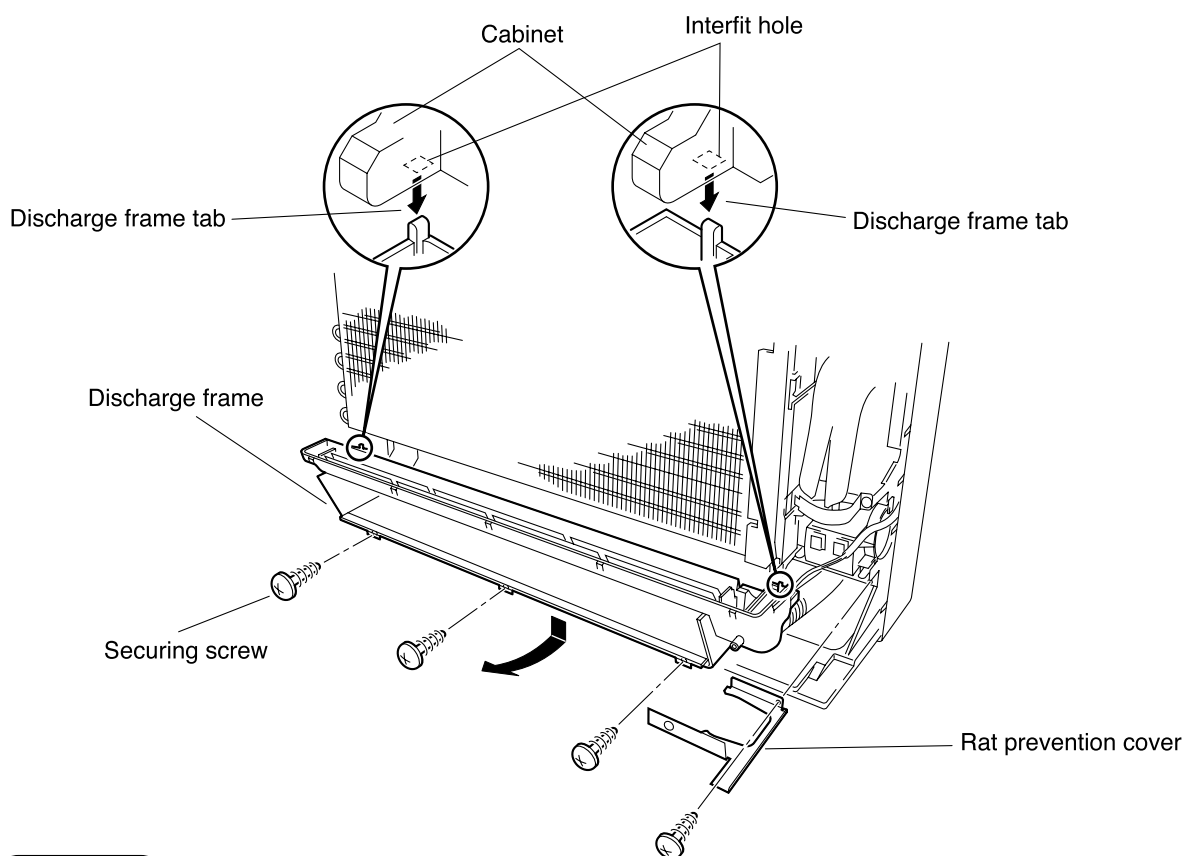


## ATTACHING

- (1) When attaching the top frame, align the left and right of the top frame with the inside of the guides on the cabinet, and then push the top frame straight to the back.  
 Note: Check to see that there is no space between the top frame and the cabinet.
- (2) Fasten the three securing screws, and then check to see that the top frame does not slip to the side.

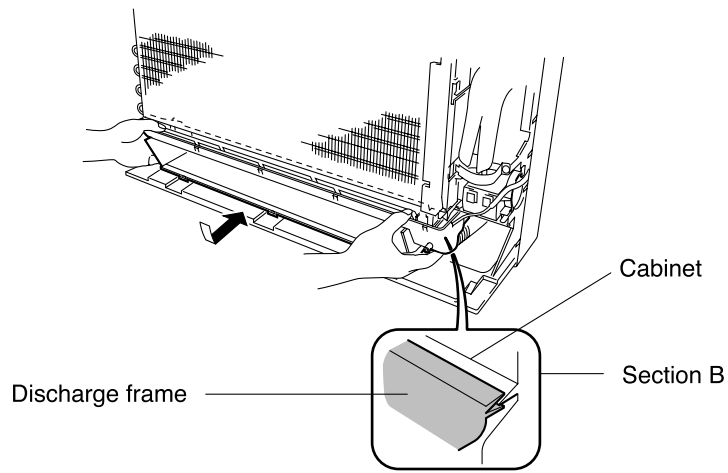
## 6. DISCHARGE FRAME

- (1) Remove the three securing screws of the discharge frame.
- (2) Remove the screw on the rat prevention cover.
- (3) Lower the rear side of the discharge frame, remove the tab on the interfit section, and then pull out the discharge frame towards you.



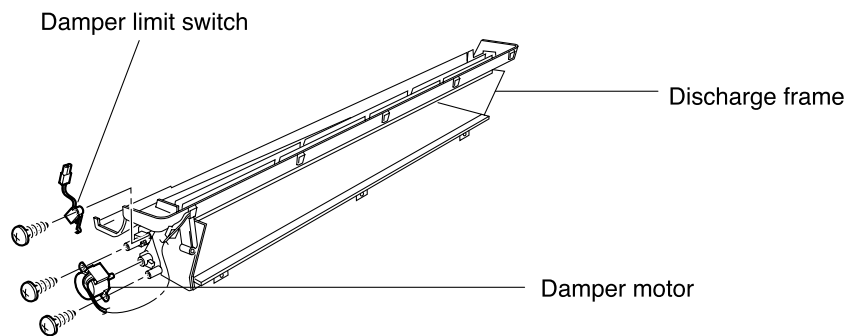
## ATTACHING

- (1) Align the tabs to the left and the right of the discharge frame with the holes in the cabinet, lift up the discharge frame while pushing it to the rear, and keep pushing until it clicks into place.  
 Note: After installing, check to see that the cabinet and the discharge frame are correctly fitted together, as shown in section B.



## 7. DAMPER MOTOR-DAMPER LIMIT SWITCH

- (1) Remove the securing screw of the damper limit switch.
- (2) Remove the two securing screws of the damper motor (stepping motor).
- (3) Pull out the damper motor and the damper limit switch, and then remove them.

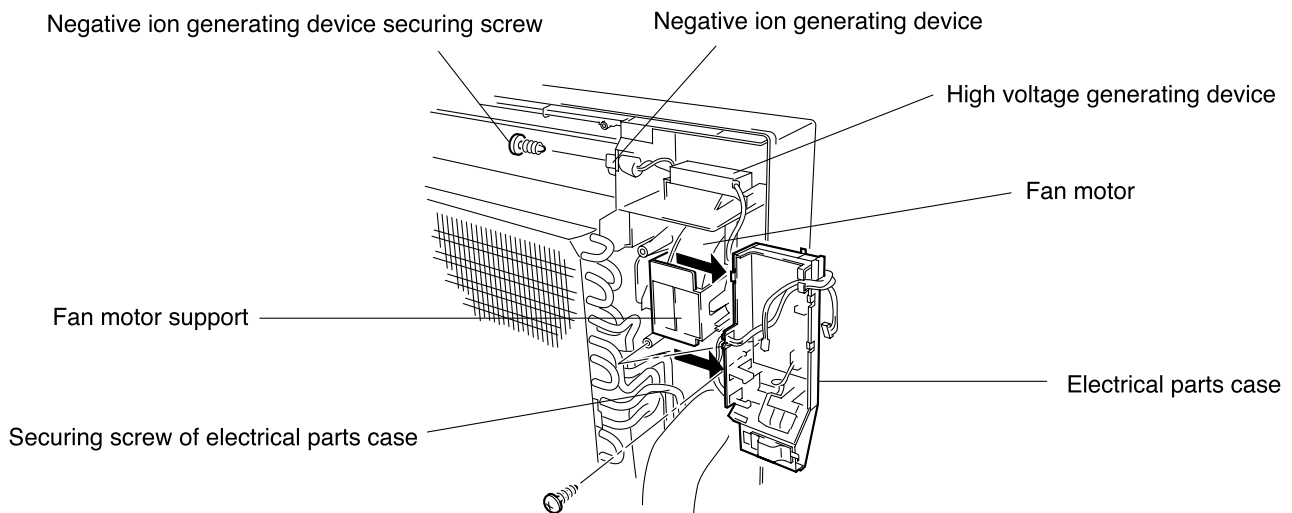


## ATTACHING

Note: After removing the damper limit switch, check to see that the switch operates when the damper goes upwards.

## 8. NEGATIVE ION GENERATING DEVICE

- (1) Remove the front panel, and then remove the front cover.
- (2) Remove the display P.W.B..
- (3) Remove the cord from the stepping motor of the air deflector.
- (4) Remove the top frame.
- (5) Use a flat-blade screwdriver to slightly lift the high voltage generating device, and then pull it towards you.
- (6) Remove the securing screw, and remove the negative ion generating device.



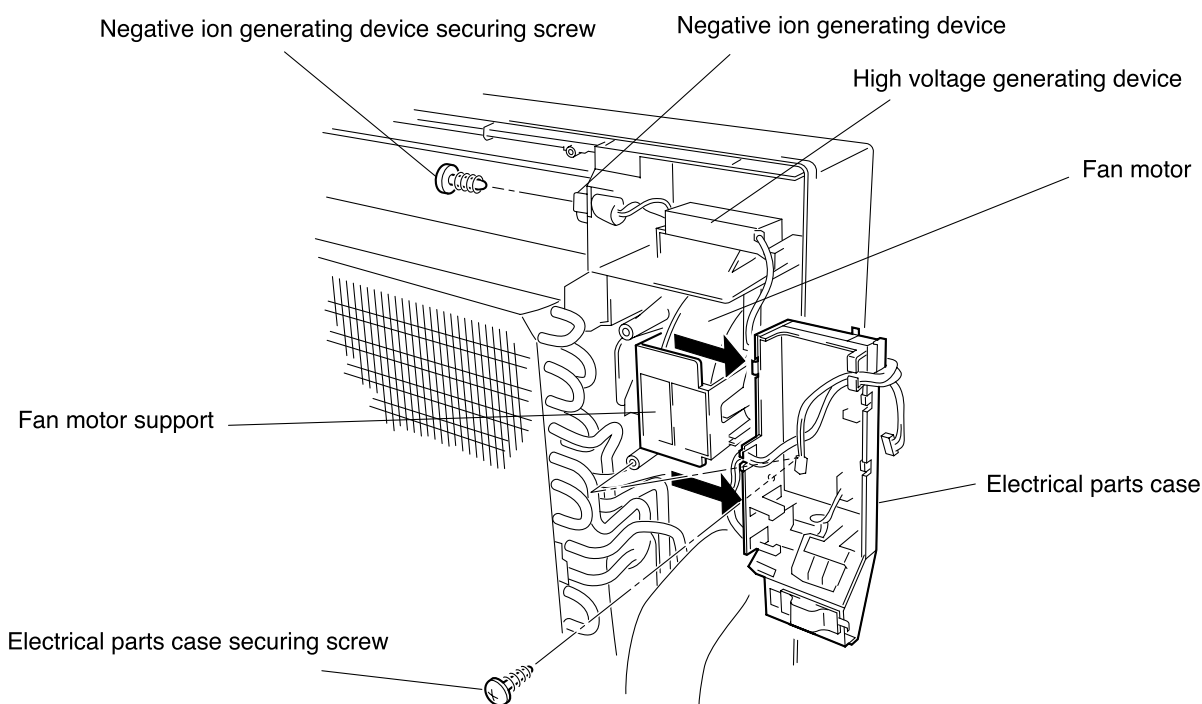
## ATTACHING

Note - Don't touch the ion generating tip when replacing the electrode.

- The ion generating tip must be replaced if it is bent.
  - Clean the electrode with a toothbrush if dust gathers on the electrode.
- Even if this happens, be sure not to touch the ion generating tip.

### 9. FAN MOTOR – TANGENTIAL AIR FLOW FAN

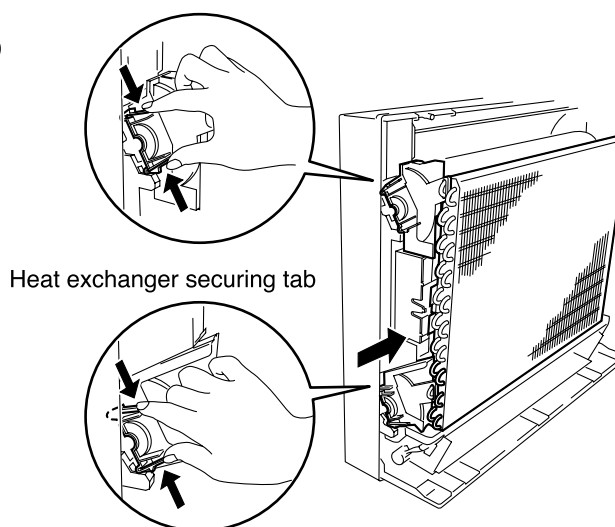
- (1) Remove the front panel, and then remove the front cover.
- (2) Remove the display P.W.B..
- (3) Remove the cord from the stepping motor of the air deflector.
- (4) Remove the top frame.
- (5) Remove the electrical parts cover, the fan motor cord, the negative ion generating device cord, and the heat exchanger thermostat cord.
- (6) Remove the pipe cover from the heat exchanger.
- (7) Remove the securing screw of the electrical parts case, then slide the electrical parts case to the right while removing it from the fan motor support.



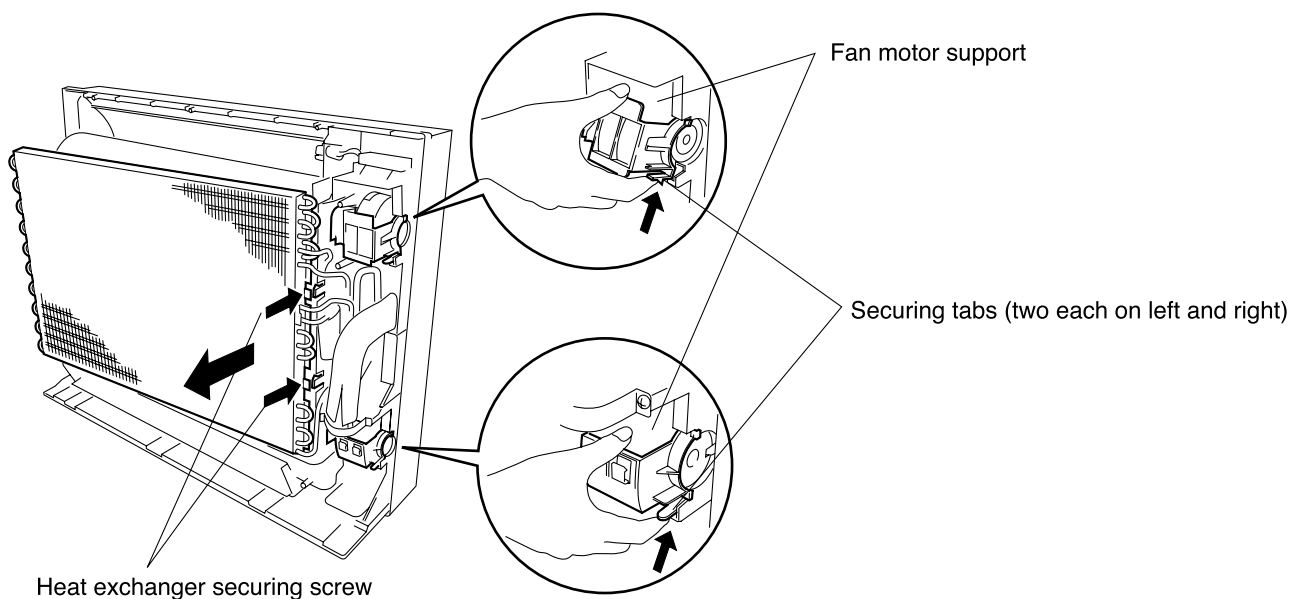
(8) Use a flat-blade screwdriver or other such tool to lift up the central securing tab and the left side of the heat exchanger.

(9) Remove the upper and lower fan covers.

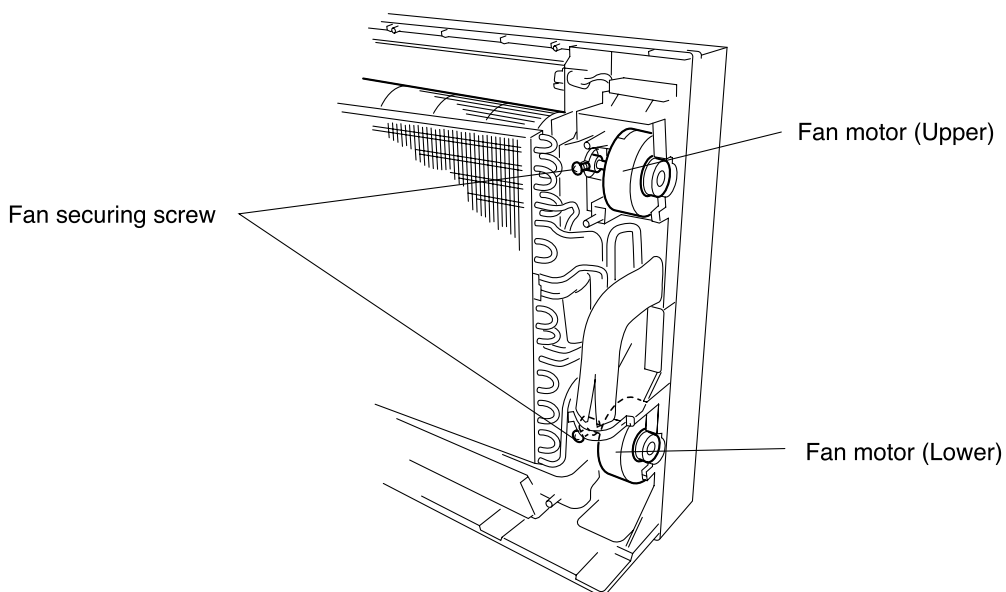
- As shown in the diagram below, bend the lever (tab) securing the fan cover inwards while pulling out the heat exchanger towards you.
- Bend the lever (tab) of the lower fan cover inwards while pulling out the lower fan cover slightly upwards and towards you.



- (10) Use a minus screwdriver or other such tool to raise the two tabs (see arrows in diagram below) securing the right side of the heat exchanger, then pull out the heat exchanger towards you.
- (11) Pull the lower section of the fan motor support towards you while raising the two levers (tabs) on the left and right of the upper and lower sides of the fan motor support securing the fan motor, and then remove the fan motor support.



- (12) Loosen the screws securing the tangential air flow fan and the fan motor, and then remove the tangential air flow fan and the fan motor.



## ATTACHING

- (1) When attaching the tangential air flow fan and the fan motor, insert the axis of the fan motor into the boss of the tangential air flow fan. Insert the fan support into the boss on the right side of the tangential air flow fan, and then insert into the fan support securing groove on the cabinet.
  - (2) Fasten the securing screws of the fan.
- Note: Rotate the fan by hand, and check to see that it does not strike the inside section.

## TROUBLE SHOOTING

MODEL RAM-70QH4, RAM-80QH4

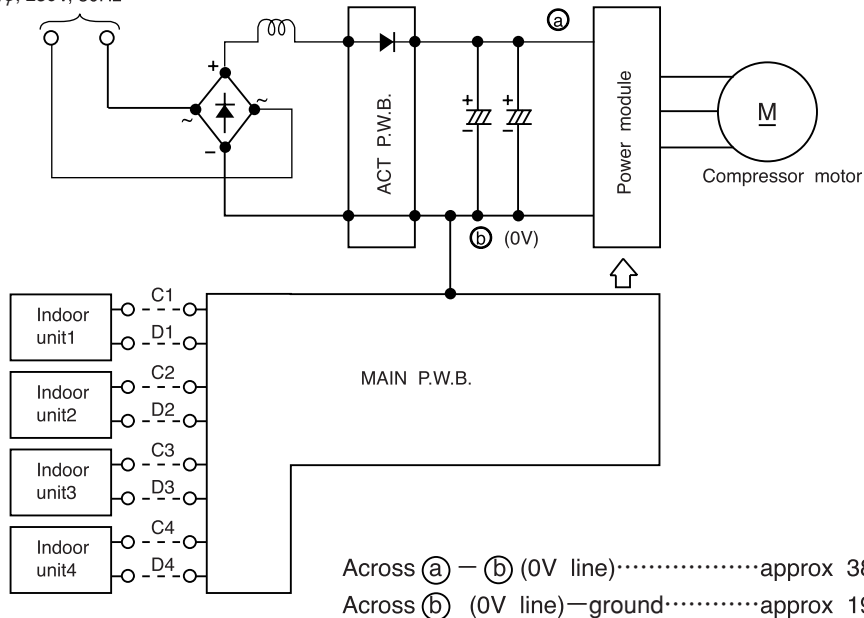
### PRECAUTIONS FOR CHECKING



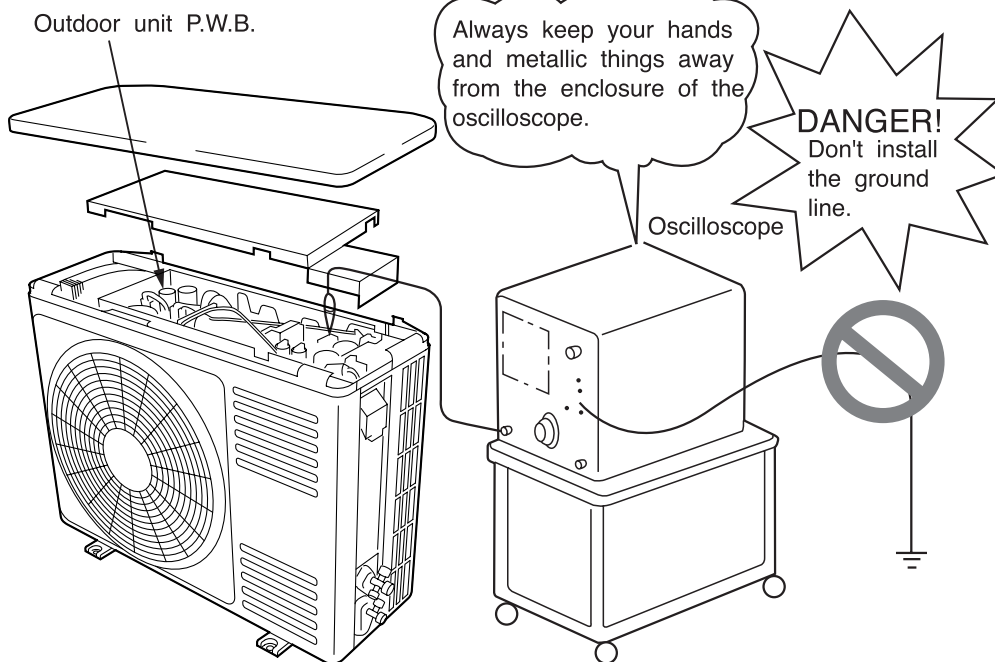
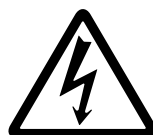
1. Remember that the 0V line is biased to 190V in reference to the ground level.
2. Also note that it takes about 10 minutes until the voltages fall after the power switch is turned off.



Power source  
1 $\phi$ , 230V, 50Hz



When using an oscilloscope, never ground it. Don't forget that high voltages as noted above may apply to the oscilloscope.

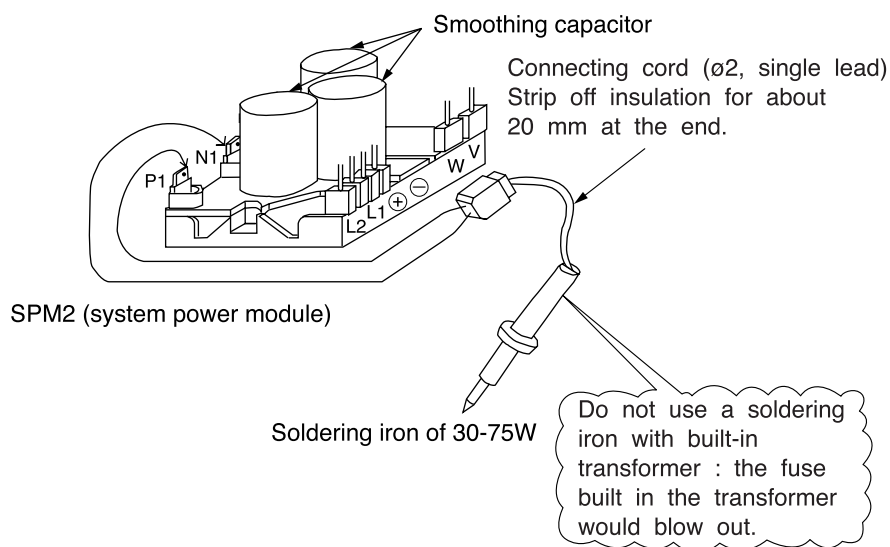




## DISCHARGING CAPACITORS

1. Turn off the indoor unit's power switch or unplug the power cord, and wait for a minute or so.
2. Open the cover of the electric parts compartment. Discharge electricity from smoothing capacitors ( $330\mu\text{F} \times 3\text{pcs.}$ ) by connecting the leads of a soldering iron of 30-75W to the terminals provided for this purpose. Continue discharging for more than 15 seconds.

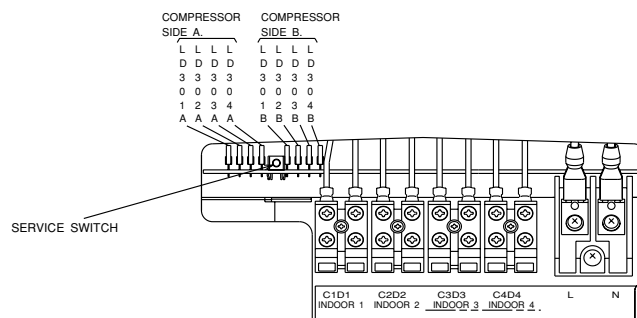
The smoothing capacitors ( $330\mu\text{F} \times 3\text{pcs.}$ ) are charged to about 380V. Don't forget to discharge them before attempting access to electric parts.



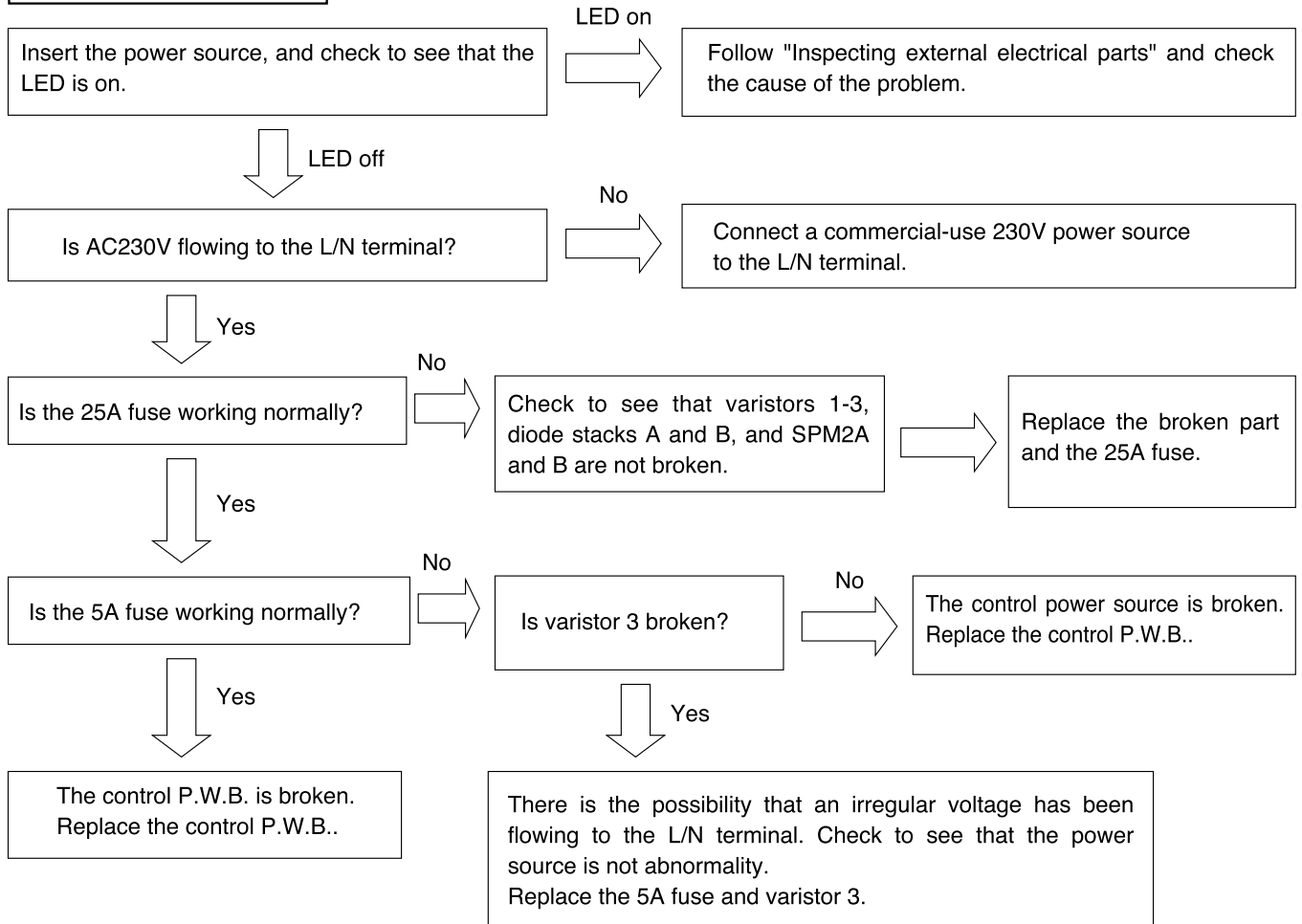
## INSPECTING EXTERNAL ELECTRICAL PARTS

- Check to see that the LED is either on or blinking.
- LEDs are divided between those for A cycle and those for B cycle. This is determined by either an A or a B appearing in the circuit code, for example LD301A or LD301B.
- Carry out inspections by examining the on/ blinking status of LEDs 301-304.

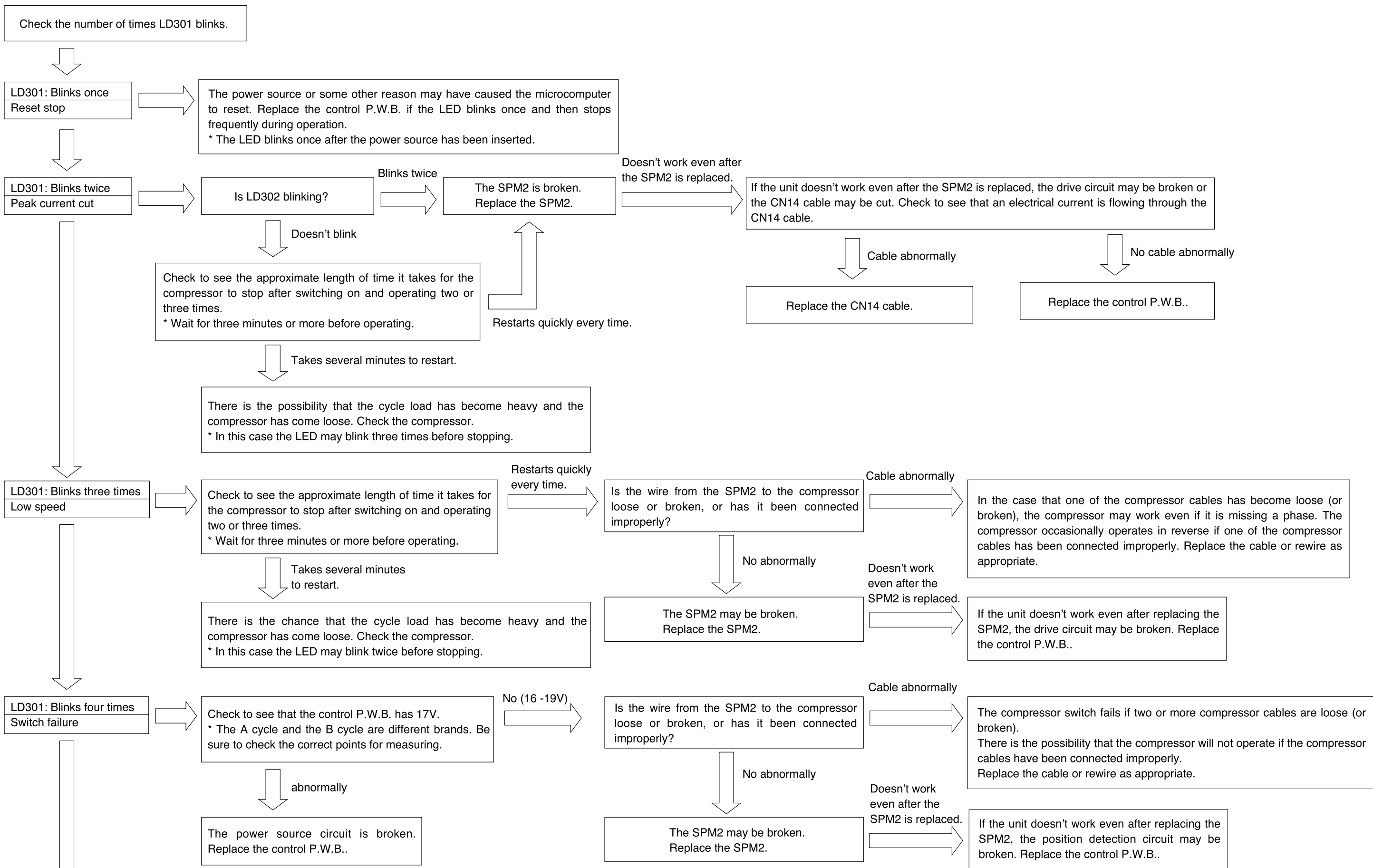
| LED number | LD301             | LD302            | LD303               | LD304          | Status                                                                                                             | Checkpoints                                                                                                                                                                                                                                                                                                                                          |
|------------|-------------------|------------------|---------------------|----------------|--------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Name       | Diagnosis lamp 1  | Diagnosis lamp 2 | Communications lamp | Operation lamp |                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                      |
| Case 1     | Off               | Off              | Off                 | Off            | Normal off status or unconnected microcomputer power source                                                        | If the LED is not on even when the power source is connected, the microcomputer power source is unconnected.<br>→Inspection method 1                                                                                                                                                                                                                 |
| Case 2     | Blinks once       | Off              | Off                 | Off            | Microcomputer reset status (immediately after inserting power source or immediately after power source abnormally) | It is normal for LD301 to blink once after the power source has been inserted. If the unit stops when it is in operation and LD301 blinks once, it is possible that the power source has been temporarily interrupted by lightening or for some other reason. Replace the control PCB if this occurs frequently.                                     |
| Case 3     | Blinks            | Off              | Off                 | Off            | Abnormally stop                                                                                                    | Abnormally stop is shown by the number of times the LED blinks.<br>→Inspection method 2                                                                                                                                                                                                                                                              |
| Case 4     | On                | Blinks           | Off                 | Off            | Thermistor abnormally                                                                                              | Thermistor abnormally is shown by the number of times the LED blinks.<br>→Inspection method 3                                                                                                                                                                                                                                                        |
| Case 5     | Off (blinks once) | Off              | Blinks              | Off (blinks)   | Communications error                                                                                               | Communications error is shown by the number of times the LED blinks.<br>→Inspection method 4<br>*In the case that an internal unit is not connected, the number of connected internal units is shown by the number of times the LED blinks. This is not a abnormally. The internal unit has no communications error and is able to operate normally. |
| Case 6     | Off               | Off              | Off                 | On             | Normal operation                                                                                                   | Normal operation                                                                                                                                                                                                                                                                                                                                     |
| Case 7     | On                | Off              | Off                 | On             | OVL1 operation                                                                                                     | Normal operation                                                                                                                                                                                                                                                                                                                                     |
| Case 8     | Off               | On               | Off                 | On             | OVL2 operation                                                                                                     | Normal operation                                                                                                                                                                                                                                                                                                                                     |
| Case 9     | On                | On               | Off                 | On             | OVL3 operation                                                                                                     | Normal operation                                                                                                                                                                                                                                                                                                                                     |

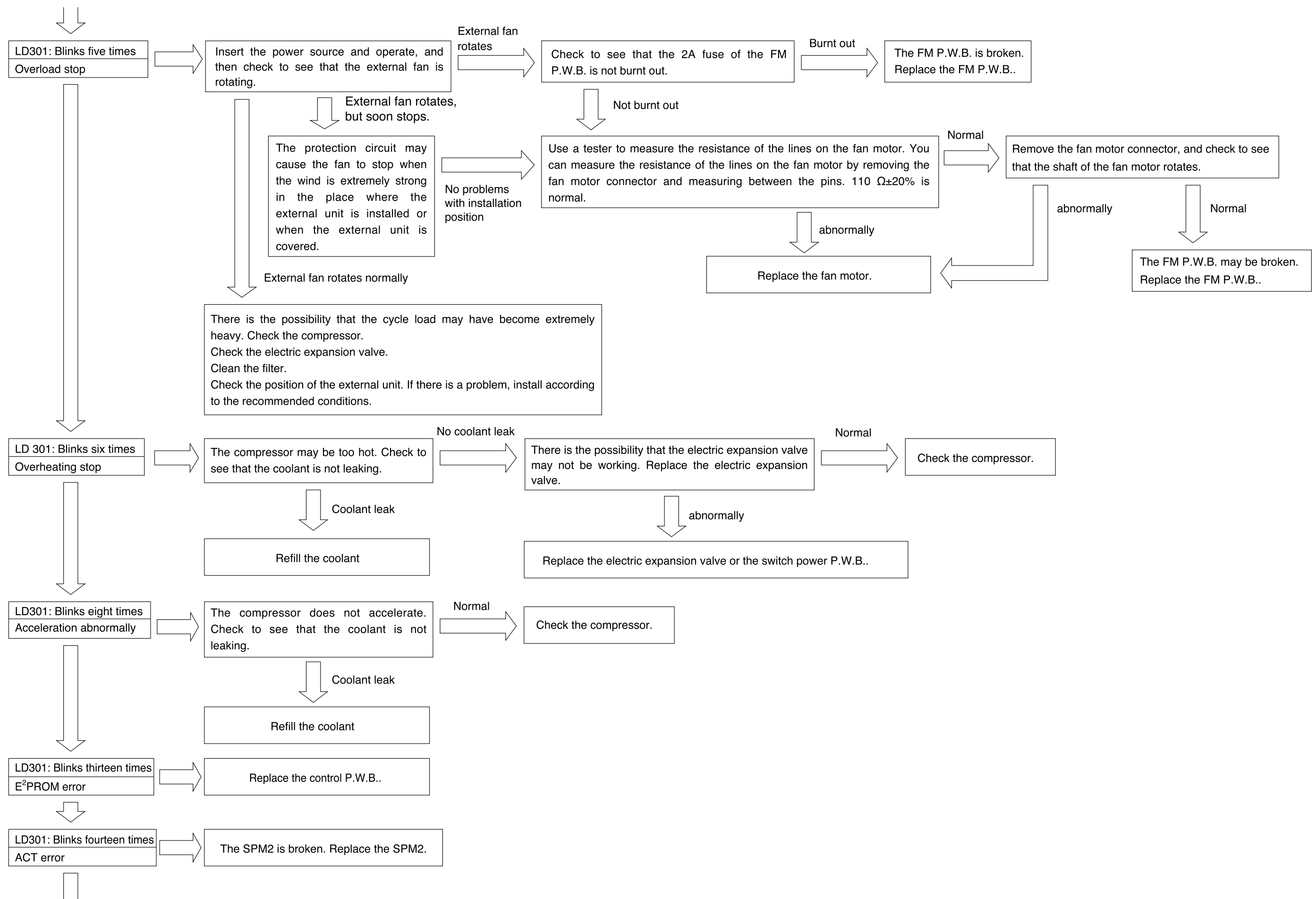


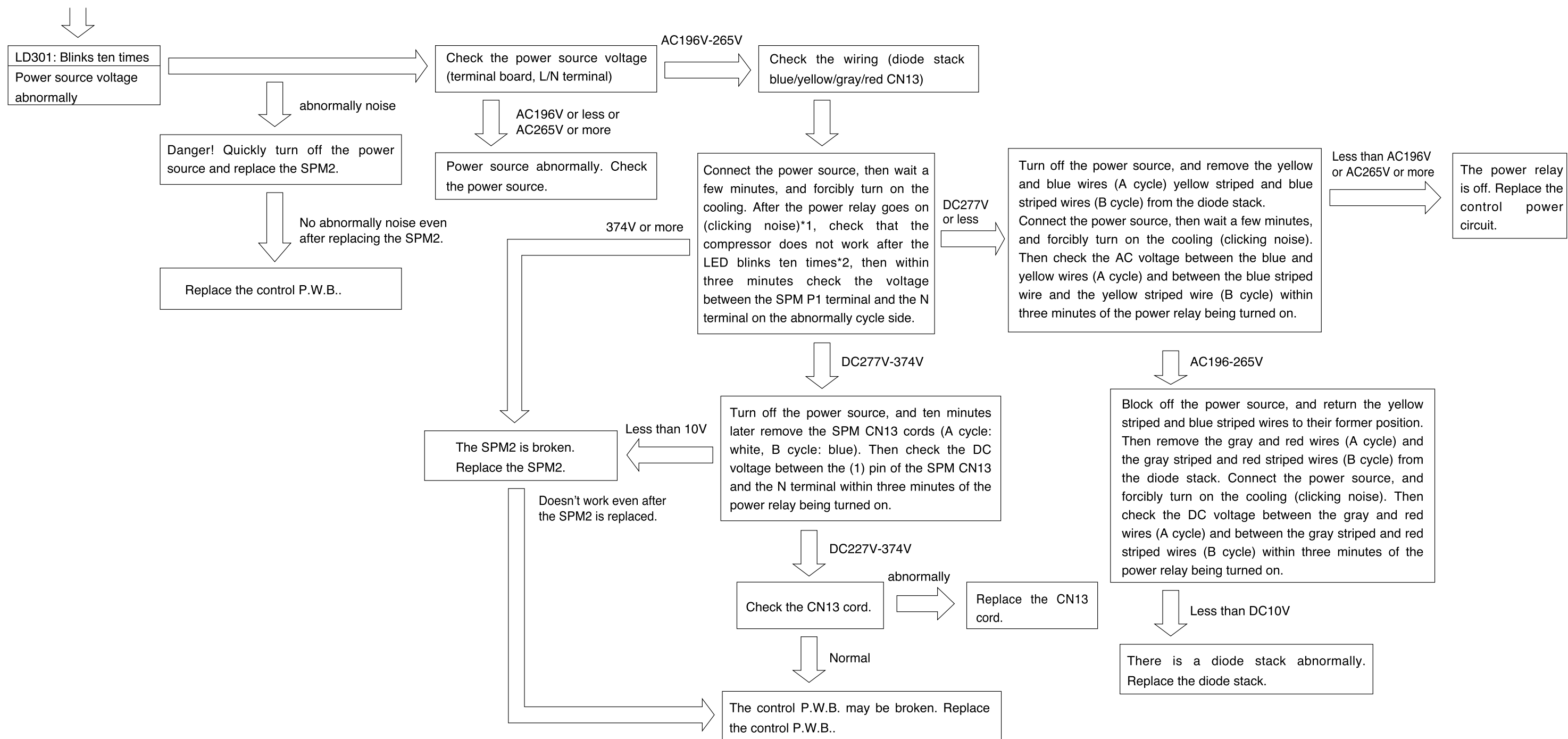
## Inspection method 1



## Inspection method 2





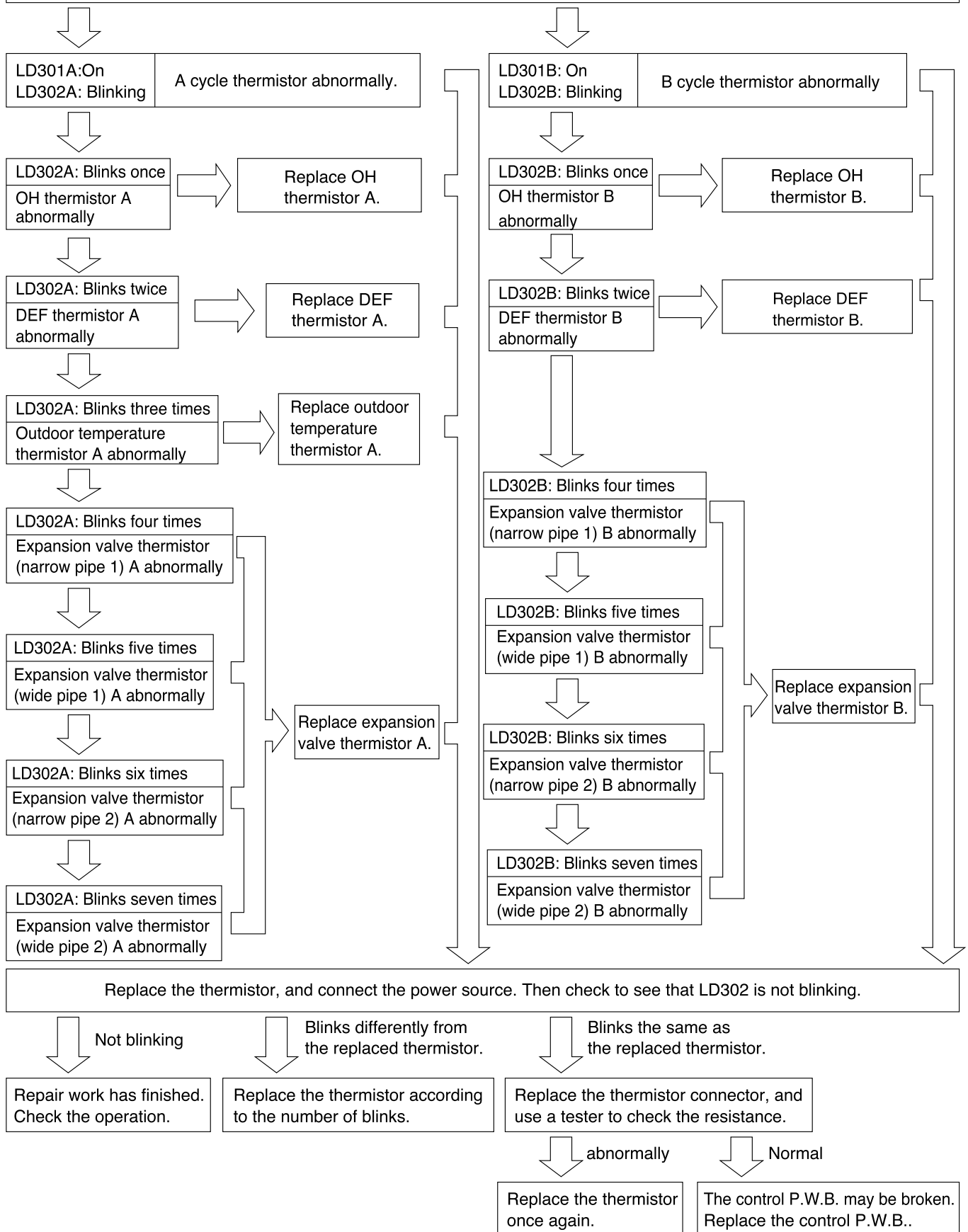


\* 1 The power relay does not turn on without an operation order. In the case of a abnormally stop, the power relay turns off after approximately three minutes.

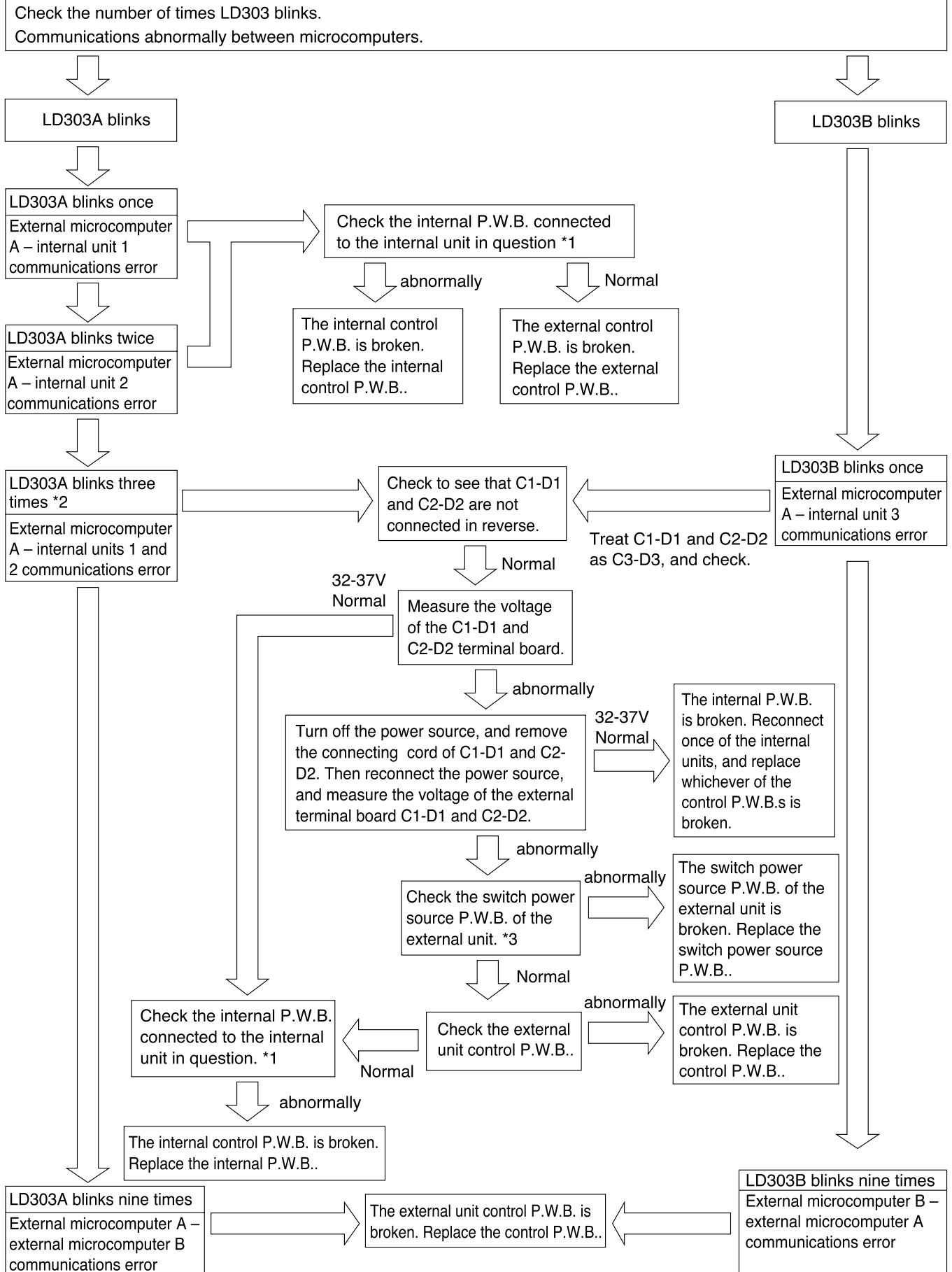
\* 2 Carry out each of the voltage checks in the three minutes between the power relay turning on and turning off.

### Inspection method 3

Check the on status of LD301 and the blinking of LD302.



## Inspection method 4







The indoor unit control P.W.B. is not broken.  
Check the outdoor unit control P.W.B..

No

Normal,

Normal,

Yes

abnormally

Normal

Normal

abnormally



Normal

abnormally

Normal

abnormally

Normal

## HOW TO OPERATE USING THE SERVICE SWITCH THE OUTDOOR UNIT

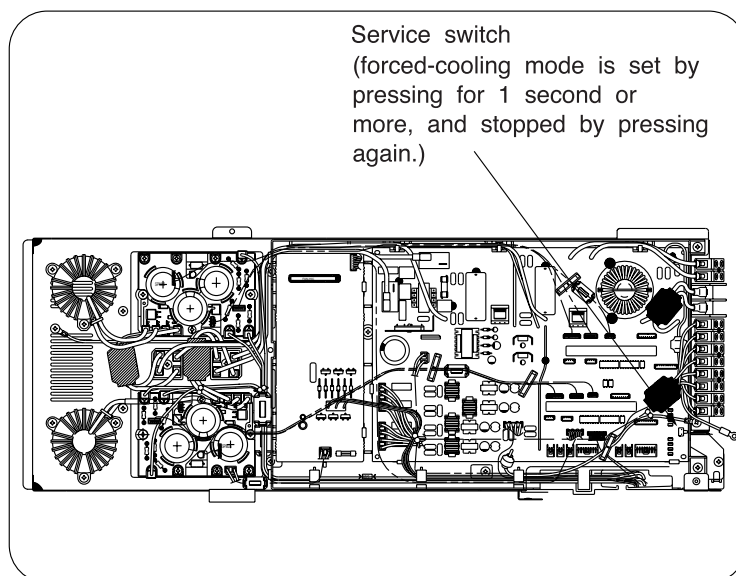
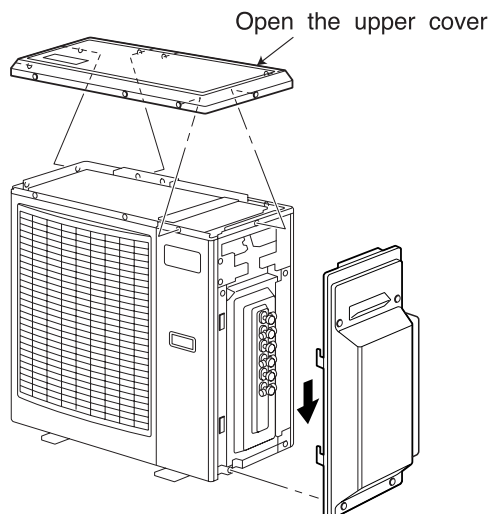
MODEL RAM-70QH4, RAM-80QH4

1. Turn the Power switch off and then turn on again.
2. Remove the electrical parts cover.
3. Press the service switch for one second or more (wait for at least 20 seconds after turning the power source switch on).

LD304 (red) will light and the unit will operate in the forced cooling mode at this time

※Check for each cycle.

Never operate the unit in this state for more than 5 minutes.



### (Cautions)

- (1) If interface signal (35V DC) terminals C and D are not connected when the outdoor unit service switch is used for checking, the outdoor unit defect indicator (LD303) will blink 9 times after operation to indicate communication error.
- (2) If you do this with the compressor connector in a removed state, LD301 will blink four times, and the unit will not work.

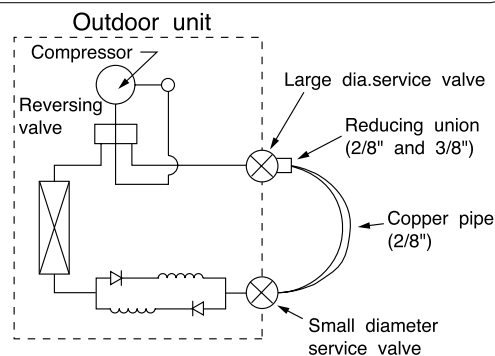
Be sure to return the service switch to "normal" after checking with service operation is completed.

## HOW TO OPERATE THE OUTDOOR UNIT INDEPENDENTLY

1. Connect the large dia. pipe side and small dia. pipe side service valves using a pipe.

Connect the small diameter service valve and the large diameter service valve using the reducing union and copper pipe as shown on the right.

Charge refrigerant of 300g after vacuuming (※1)



### Parts to be prepared

- (1) Reducing union  
2/8" (6.35mm)  
3/8" (9.52mm)
- (2) Copper pipe (2/8" and 3/8")

Do not operate for 5 minutes or more

The operation method is the same as "How to operate using the connector to servicing the outdoor unit"

※1 The charging amount of 300g is equivalent to the load in normal operation.

# LIGHTING MODE OF THE SELF-DIAGNOSIS LAMP

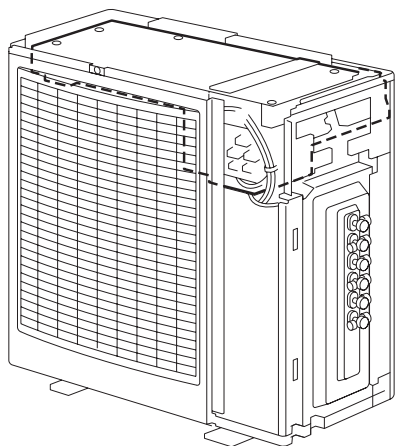
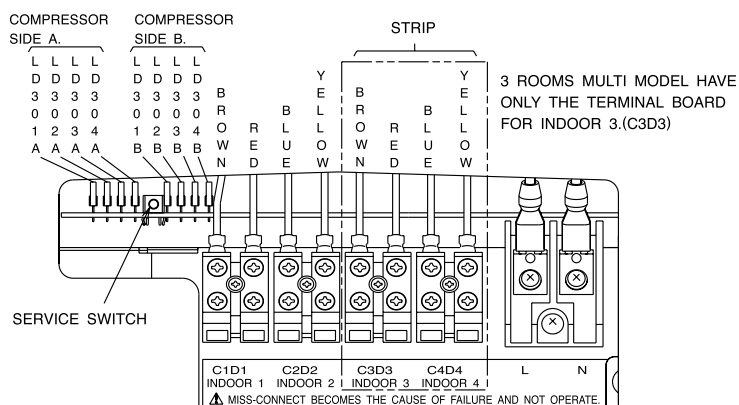
MODEL RAM-70QH4, RAM-80QH4

## 1 INSTALLATION POSITION OF SELF-DIAGNOSIS LAMP

Be sure to turn off the power source when connecting and removing the cable.

Be careful of electrocution when operating the service switch.

### Positions of self-diagnosis lamps (LEDs)



MODEL RAM-70QH4, RAM-80QH4

**⚠ DANGER(DC360V)**

- WAIT FOR FIFTEEN-MINUTES (MIN.) EVER AFTER TURNING OFF THE POWER SWITCH WHEN SERVICE WORK IS DONE.

**⚠ DANGER (COURANT CONTINU DE 360V)**

- ATTENDRE QUINZE MINUTES (MIN.) APRÈS AVOIR COMMUTÉ L'INTERRUPTEUR D'ALIMENTATION SUR ARRÊT LORSQUE LES OPÉRATIONS DE SERVICE SONT TERMINÉES.

**SELF-DIAGNOSIS LIGHTING MODE**   ☒:LIT   ☒:BLINKING   ☐:OFF

COMPRESSOR SIDE A

COMPRESSOR SIDE B

SPIRAL STRIPS

3 ROOMS MULTI MODEL HAVE ONLY THE TERMINAL BOARD FOR INDOOR 3.(C3D3)

SERVICE SWITCH  
(BE CAREFUL OF AN ELECTRIC SHOCK AT THE TIME OF OPERATION.)

MAKE SURE THAT THE EXCLUSIVE BREAKER IS TURNED OFF BEFORE CABLE CONNECTION AND REMOVAL.

| SELF-DIA-GNOSIS NAME                                                                             | DETAILS                                                               | MAIN CHECK POINT                                                                                                                             |
|--------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>            | NORMAL OPERATION                                                      | COMPRESSOR OPERATION                                                                                                                         |
| <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>            | OVERLOAD (1)                                                          | <p>THE ROTATION SPEED IS AUTOMATICALLY CONTROLLED TO PROTECT THE COMPRESSOR IN THE OVERLOAD CONDITION.</p>                                   |
| <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>            | OVERLOAD (2)                                                          |                                                                                                                                              |
| <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> | OVERLOAD (3)                                                          |                                                                                                                                              |
| <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>                       | NORMAL STOP                                                           | INDOOR THERMOSTAT OFF.<br>MAIN OPERATION OFF.                                                                                                |
| <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>            | RESET STOP                                                            | WHEN STOPPED WITH POWER RESET.<br>(NORMAL WHEN POWER HAS BEEN TURNED ON.)                                                                    |
| <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>            | 1TIME<br>PEAK CURRENT CUT                                             | OVERCURRENT IS DETECTED.                                                                                                                     |
| <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>            | 2TIMES<br>ABNORMAL LOW SPEED ROTATION                                 | POSITION DETECTION SIGNAL IS NOT INPUT DURING OPERATION.                                                                                     |
| <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>            | 3TIMES<br>SWITCHING FAILURE                                           | SWITCHING FROM LOW FREQUENCY SYNC START TO POSITION DETECTION OPERATION FAILURE.                                                             |
| <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>            | 4TIMES<br>OVERLOAD LOWER LIMIT CUT                                    | UNDER THE LOWER LIMIT OF ROTATION SPEED WITH OVERLOAD CONTROL CIRCUIT OPERATED.                                                              |
| <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>            | 5TIMES<br>OH THERMISTOR TEMP. RISE                                    | OH THERMISTOR OPERATED.                                                                                                                      |
| <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>            | 6TIMES<br>ACCELERATION DEFECTIVE                                      | NO ACCELERATION OVER THE LOWER LIMIT OF THE ROTATION SPEED.                                                                                  |
| <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>            | 8TIMES<br>ABNORMAL POWER VOLTAGE                                      | POWER VOLTAGE IS ABNORMALLY LOW.                                                                                                             |
| <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>            | 10TIMES<br>EEPROM READ ERROR                                          | MICROCOMPUTER CANNOT READ THE DATA IN EEPROM.                                                                                                |
| <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>            | 13TIMES<br>ACTIVE CONVERTER DEFECTIVE                                 | OVERVOLTAGE IS DETECTED BY SYSTEM POWER MODULE.                                                                                              |
| <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>            | 14TIMES<br>SYSTEM POWER MODULE ERROR                                  | OVERVOLTAGE IS DETECTED BY SYSTEM POWER MODULE.                                                                                              |
| <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>            | 2TIMES<br>THERMISTOR ABNORMAL                                         | THERMISTOR IS OPEN OR SHORTED.<br>*REFER TO THE FOLLOWING "CORRESPONDENCE TABLE FOR ABNORMAL THERMISTOR"                                     |
| <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>            | 1TIME<br>COMMUNICATIONS ERROR 1 BETWEEN INDOOR UNIT AND OUTDOOR UNIT  | COMPRESSOR SIDE A. COMMUNICATION ERROR OF INDOOR 1                                                                                           |
| <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>            | 2TIMES<br>COMMUNICATIONS ERROR 2 BETWEEN INDOOR UNIT AND OUTDOOR UNIT | COMPRESSOR SIDE A. COMMUNICATION ERROR OF INDOOR 2                                                                                           |
| <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>            | 3TIMES<br>COMMUNICATIONS ERROR 3 BETWEEN INDOOR UNIT AND OUTDOOR UNIT | COMPRESSOR SIDE A. COMMUNICATION ERROR OF INDOOR 1 AND 2                                                                                     |
| <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>            | 9TIMES<br>COMMUNICATIONS ERROR BETWEEN OUTDOOR UNIT                   | COMMUNICATIONS BETWEEN MICROCOMPUTERS OF COMPRESSOR SIDE A & COMPRESSOR SIDE B ARE INTERRUPTED.<br>(EEPROM READ ERROR ALSO 9 TIMES BLINKING) |
| <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>            | 1TIME<br>COMMUNICATIONS ERROR 1 BETWEEN INDOOR UNIT AND OUTDOOR UNIT  | COMPRESSOR SIDE B. COMMUNICATION ERROR OF INDOOR 3                                                                                           |
| <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>            | 2TIMES<br>COMMUNICATIONS ERROR 2 BETWEEN INDOOR UNIT AND OUTDOOR UNIT | COMPRESSOR SIDE B. COMMUNICATION ERROR OF INDOOR 4                                                                                           |
| <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>            | 3TIMES<br>COMMUNICATIONS ERROR 3 BETWEEN INDOOR UNIT AND OUTDOOR UNIT | COMPRESSOR SIDE B. COMMUNICATION ERROR OF INDOOR 3 AND 4                                                                                     |
| <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>            | 9TIMES<br>COMMUNICATIONS ERROR BETWEEN OUTDOOR UNIT                   | COMMUNICATIONS BETWEEN MICROCOMPUTERS OF COMPRESSOR SIDE A & COMPRESSOR SIDE B ARE INTERRUPTED.<br>(EEPROM READ ERROR ALSO 9 TIMES BLINKING) |

\*EXAMPLE OF BLINKING (5 TIMES)    25SEC (  ...LIGHTS FOR 0.25 SEC AT INTERVAL OF 0.25 SEC.)

**CORRESPONDENCE TABLE FOR ABNORMAL THERMISTOR**

| BLINKING TIMES | ABNORMAL THERMISTOR                      |                                          |
|----------------|------------------------------------------|------------------------------------------|
|                | LD302A(ORANGE) BLINKING                  | LD302B(ORANGE) BLINKING                  |
| 1TIME          | COMPRESSOR SIDE A.OH THERMISTOR          | COMPRESSOR SIDE B.OH THERMISTOR          |
| 2TIMES         | COMPRESSOR SIDE A.DEFROST THERMISTOR     | COMPRESSOR SIDE B.DEFROST THERMISTOR     |
| 3TIMES         | OUTSIDE TEMPERATURE THERMISTOR           |                                          |
| 4TIMES         | THERMISTOR FOR INDOOR UNIT 1 NARROW PIPE | THERMISTOR FOR INDOOR UNIT 3 NARROW PIPE |
| 5TIMES         | THERMISTOR FOR INDOOR UNIT 1 WIDE PIPE   | THERMISTOR FOR INDOOR UNIT 3 WIDE PIPE   |
| 6TIMES         | THERMISTOR FOR INDOOR UNIT 2 NARROW PIPE | THERMISTOR FOR INDOOR UNIT 4 NARROW PIPE |
| 7TIMES         | THERMISTOR FOR INDOOR UNIT 2 WIDE PIPE   | THERMISTOR FOR INDOOR UNIT 4 WIDE PIPE   |

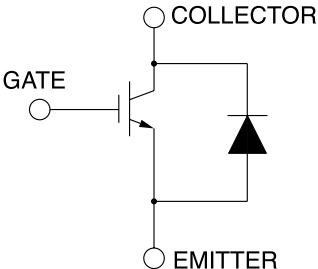
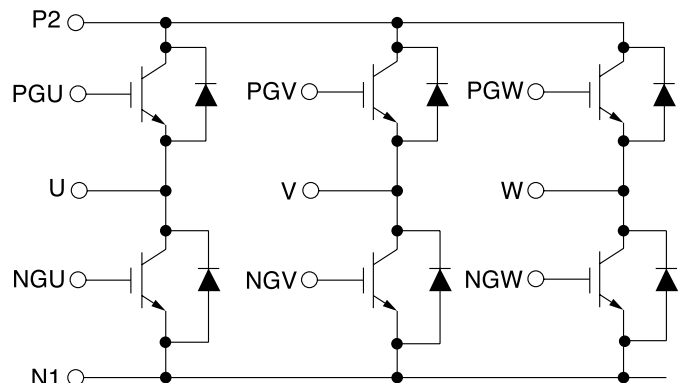
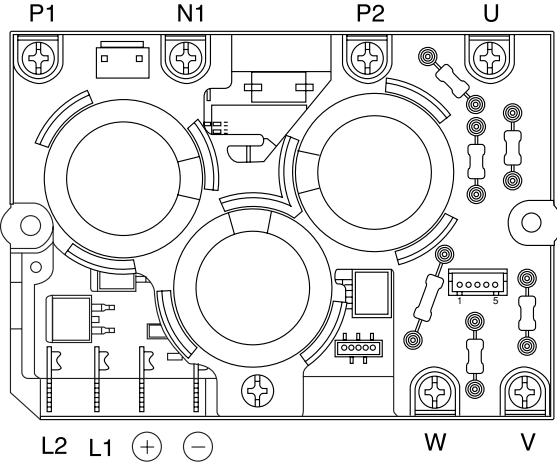
**SERVICE OPERATION**

BEFORE PROCEEDS THE REFRIGERANT WITHDRAWAL OR SINGLE OPERATION OF THE OUTDOOR UNIT, SWITCH OFF THE EXCLUSIVE BREAKER FIRST AND ON AGAIN AND AFTER WAIT FOR MORE THAN 20 SECONDS PRESS THE SERVICE SWITCH OF THIS UNITS/CIRCUIT BOARD FOR MORE THAN 1 SECOND. (IT OPERATES AS COOLING CYCLE.)

TO PROTECT THE UNIT FROM THE DAMAGE, PLEASE DO NOT OPERATE WHEN THE SPINDLE OF THE SERVICE VALVE IS CLOSED.

TO STOP, PUSH THE SERVICE SWITCH AT LEAST 1 SECOND. IN CASE TO START OPERATION AGAIN, PLEASE SWITCH OFF AND OFF THE BREAKER AGAIN.

# TROUBLE SHOOTING OF THE SYSTEM POWER MODULE

| MODE                                                                                                                   | GT15J31ISM                                                                                                                                                                                             |
|------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ELEMENT<br>CIRCUIT                                                                                                     |                                                                                                                      |
| INTERNAL<br>CIRCUIT OF<br>THE MODULE                                                                                   |                                                                                                                     |
| TERMINAL<br>SYMBOL<br>OF SYSTEM<br>POWER<br>MODULE<br><br><br>SEE NEXT<br>PAGE<br>FOR VALUES<br>MEASURED<br>BY TESTER. |  <p data-bbox="406 1870 1260 1915">* Do not disassemble the system power module when performing the diagnosis.</p> |

## HOW TO CHECK POWER MODULE

### Checking power module using tester

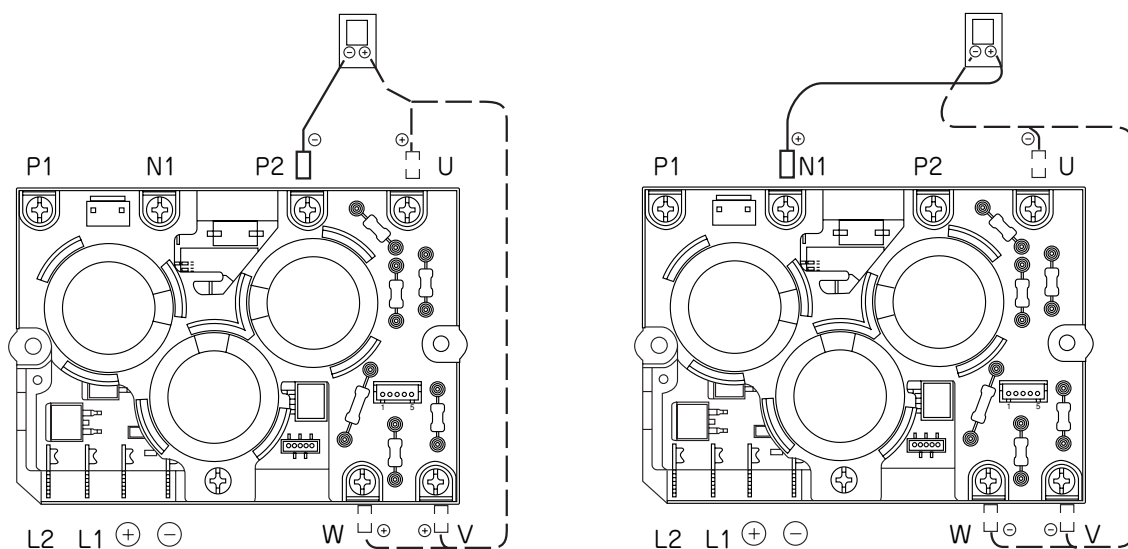
Set tester to resistance range ( $\times 100$ )

If indicator does not swing in the following conductivity check, the power module is normal.

(In case of digital tester, since built-in battery is set in reverse direction,  $\oplus$  and  $\ominus$  terminals are reversed.)

#### CAUTION


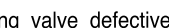

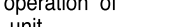

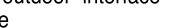







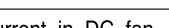




If inner circuit of power module is disconnected (open), the indicator of tester will not swing and this may assumed as normal. In this case, if indicator swings when  $\oplus$  and  $\ominus$  terminals are connected in reverse of diagram below, it is normal. Furthermore, compare how indicator swings at U, V and W phases. If indicator swings the same way at each point, it is normal.




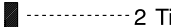

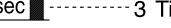





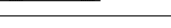







TROUBLESHOOTING WHEN THE TIMER LAMP BLINKS

MODEL RAD-28QH4, RAD-40QH4


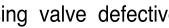

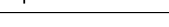



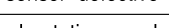

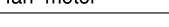




Perform troubleshooting according to the number of times the timer lamp on the display of the indoor unit blinks.


| Lamp blinking mode                                                                                                                                                                 | Main defective                       |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|
|  2 sec  Once     | Reversing valve defective            |
|  2 sec  2 Times  | Forced operation of outdoor unit     |
|  2 sec  3 Times  | Indoor / outdoor interface defective |
|  2 sec  4 Times  | Outdoor electric assembly defective  |
|  2 sec  6 Times  | Abnormal water level detection       |
|  2 sec  7 Times  | During drain pump test drive         |
|  2 sec  9 Times  | Indoor thermistor abnormal           |
|  2 sec  10 Times | Over current in DC fan moter         |
|  2 sec  13 Times | IC401 defective                      |


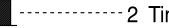

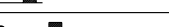















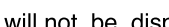




| Lamp blinking mode                                                                                                                                                                 | Main defective                       |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|
|  2 sec  Once     | Reversing valve defective            |
|  2 sec  2 Times  | Forced operation of outdoor unit     |
|  2 sec  3 Times  | Indoor / outdoor interface defective |
|  2 sec  6 Times  | Abnormal water level detection       |
|  2 sec  7 Times  | During drain pump test drive         |
|  2 sec  9 Times  | Indoor thermistor abnormal           |
|  2 sec  10 Times | Over current in DC fan moter         |
|  2 sec  13 Times | IC401 defective                      |

(  --- Lights for 0.35 sec at interval of 0.35 sec. )

MODEL RAF-25NH4, RAF-50NH4

| Lamp blinking mode                                                                                                                                                                     | Main defective                            |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|
|  2 sec  Once     | Reversing valve defective                 |
|  2 sec  2 Times  | Forced operation of outdoor unit          |
|  2 sec  3 Times  | Indoor/Outdoor interface defective        |
|  2 sec  8 Times  | Damper defective                          |
|  2 sec  9 Times  | Indoor sensor defective                   |
|  2 sec  10 Times | Abnormal rotating numbers of DC fan motor |
|  2 sec  13 Times | IC401 defective                           |

(  ---- Lights for 0.35 sec at interval of 0.35 sec. )

| Lamp blinking mode                                                                                                                                                                      | Main defective                   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|
|  2 sec  2 Times  | Peak current cut                 |
|  2 sec  3 Times  | Abnormal low speed rotation      |
|  2 sec  4 Times  | Switching failure                |
|  2 sec  5 Times  | Overload lower limit cut         |
|  2 sec  6 Times  | OH thermistor temp. rise         |
|  2 sec  7 Times  | Outdoor thermistor abnormal      |
|  2 sec  8 Times  | Acceleration defective           |
|  2 sec  9 Times  | Communications error             |
|  2 sec  12 Times | Fan lock error                   |
|  2 sec  13 Times | Defective EEPROM of outdoor unit |
|  2 sec  14 Times | Defective active converter       |
|  2 sec  15 Times | Discharge error                  |

< Cautions >

- If the interface circuit is faulty when power is supplied, self-diagnosis will not be displayed.
- If the indoor unit does not operate at all, check to see if the connecting cord is reversely connected or disconnected.

Fan Motor Set Wind Volocity and DC Voltage (between blue and red) characteristics.

MODEL RAF-32QH1

| MODE             |           |                         | FAN SPEED                   | Connector blue - red voltage (V) | Rotation speed (min. <sup>-1</sup> ) | LABEL NAME |
|------------------|-----------|-------------------------|-----------------------------|----------------------------------|--------------------------------------|------------|
| Indoor fan speed | Upper fan | Heating operation       | SUPER LO SS                 | 12.1                             | 650                                  | AFWSS      |
|                  |           |                         | SLEEP                       | 19.7                             | 910                                  | AWSOY      |
|                  |           |                         | LO S                        | 19.7                             | 910                                  | AFWSSZ     |
|                  |           |                         | OVER LOAD                   | 24.3                             | 1100                                 | AFWKAF     |
|                  |           |                         | MED LO                      | 24.3                             | 1100                                 | AFWL       |
|                  |           |                         | HI (SET FAN SPEED AUTO HI)  | 27.4                             | 1250                                 | AFWAH      |
|                  |           |                         | HI (SET FAN SPEED HI)       | 27.4                             | 1250                                 | AFWH       |
|                  |           |                         | SUPER HI (SET FAN SPEED HI) | 27.4                             | 1250                                 | AFWHH      |
|                  |           | Cooling operation       | SLEEP                       | 18.1                             | 820                                  | AFCSOY     |
|                  |           |                         | LO S                        | 20.3                             | 920                                  | AFCSSZ     |
|                  |           |                         | COOL rhythm S               | 20.3                             | 920                                  | AFCRS      |
|                  |           |                         | COOL rhythm LO              | 24.5                             | 1100                                 | AFCRL      |
|                  |           |                         | MED LO                      | 24.5                             | 1100                                 | AFCL       |
|                  |           |                         | HI                          | 29.6                             | 1220                                 | AFCH       |
|                  |           |                         | HIHI                        | 29.6                             | 1220                                 | AFCHH      |
|                  |           | Dehumidifying operation | SLEEP LO S                  | 20.3                             | 830                                  | AFDSSZ     |
|                  |           |                         | MED LO                      | 20.3                             | 830                                  | AFDL       |
|                  | Lower fan | Heating operation       | HI                          | 20.3                             | 830                                  | AFDH       |
|                  |           |                         | LO S                        | 21.6                             | 1080                                 | AFWUDS     |
|                  |           |                         | MED LO                      | 22.8                             | 1150                                 | AFWUDL     |
|                  |           | Cooling operation       | HI                          | 25.7                             | 1290                                 | AFWUDH     |
|                  |           |                         | LO S                        | 0                                | —                                    | AFCUDS     |
|                  |           |                         | MED LO                      | 0                                | —                                    | AFCUDL     |
|                  |           |                         | HI                          | 25.7                             | 1100                                 | AFCUDH     |

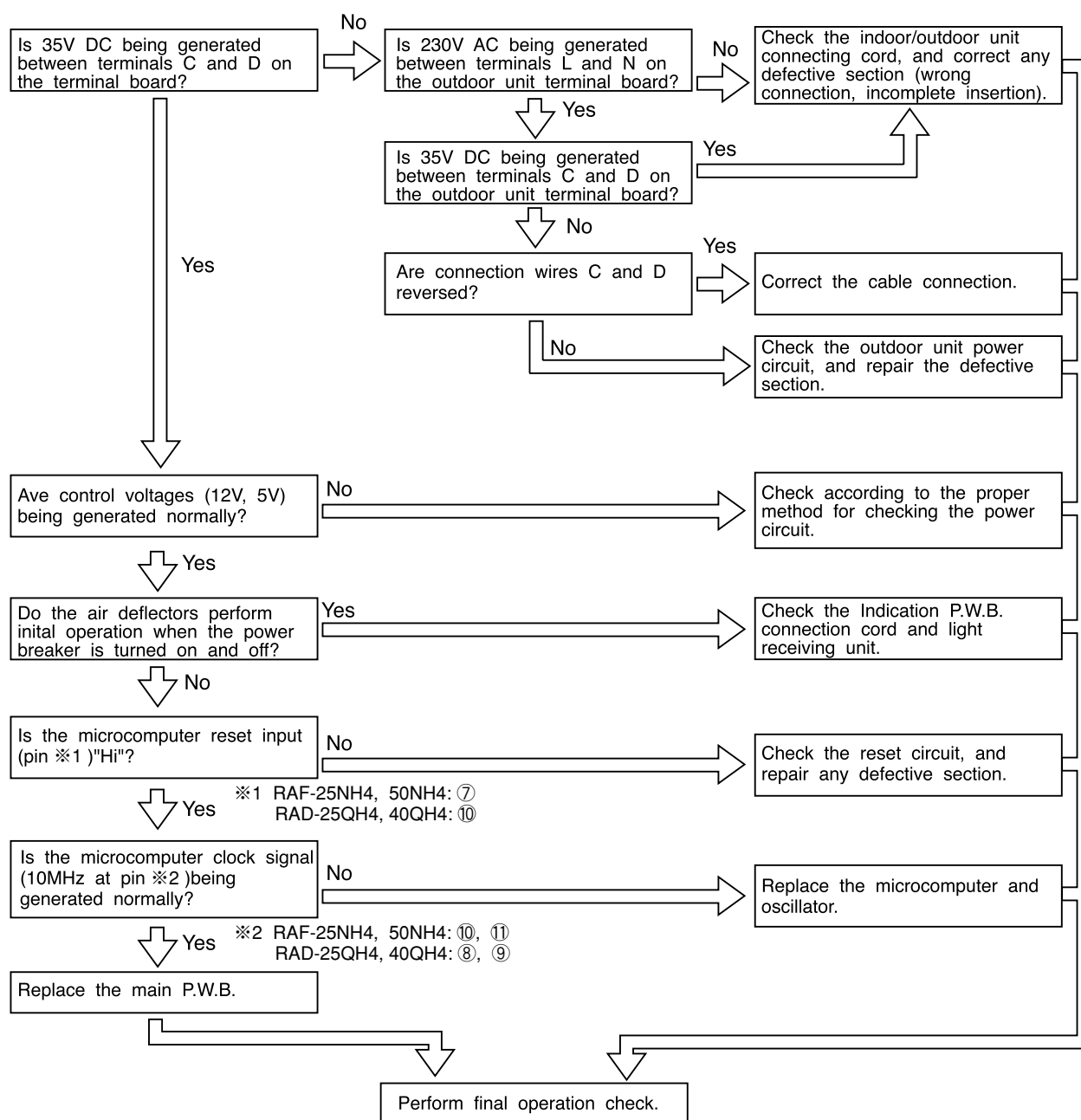
MODEL RAF-40QH1

| MODE             |           |                         | FAN SPEED                   | Connector blue - red voltage (V) | Rotation speed (min. <sup>-1</sup> ) | LABEL NAME |
|------------------|-----------|-------------------------|-----------------------------|----------------------------------|--------------------------------------|------------|
| Indoor fan speed | Upper fan | Heating operation       | SUPER LO SS                 | 12.1                             | 650                                  | AFWSS      |
|                  |           |                         | SLEEP                       | 21.5                             | 980                                  | AWSOY      |
|                  |           |                         | LO S                        | 21.5                             | 980                                  | AFWSSZ     |
|                  |           |                         | OVER LOAD                   | 25.1                             | 1130                                 | AFWKAF     |
|                  |           |                         | MED LO                      | 25.1                             | 1130                                 | AFWL       |
|                  |           |                         | HI (SET FAN SPEED AUTO HI)  | 30.8                             | 1300                                 | AFWAH      |
|                  |           |                         | HI (SET FAN SPEED HI)       | 30.8                             | 1300                                 | AFWH       |
|                  |           |                         | SUPER HI (SET FAN SPEED HI) | 30.8                             | 1300                                 | AFWHH      |
|                  |           | Cooling operation       | SLEEP                       | 18.1                             | 820                                  | AFCSOY     |
|                  |           |                         | LO S                        | 21.4                             | 940                                  | AFCSSZ     |
|                  |           |                         | COOL rhythm S               | 21.4                             | 940                                  | AFCRS      |
|                  |           |                         | COOL rhythm LO              | 26.7                             | 1120                                 | AFCRL      |
|                  |           |                         | MED LO                      | 26.7                             | 1120                                 | AFCL       |
|                  |           |                         | HI                          | 31.5                             | 1250                                 | AFCH       |
|                  |           |                         | HIHI                        | 31.5                             | 1250                                 | AFCHH      |
|                  |           | Dehumidifying operation | SLEEP LO S                  | 21.4                             | 950                                  | AFDSSZ     |
|                  |           |                         | MED LO                      | 21.4                             | 950                                  | AFDL       |
|                  |           |                         | HI                          | 21.4                             | 950                                  | AFDH       |
|                  | Lower fan | Heating operation       | LO S                        | 21.6                             | 1080                                 | AFWUDS     |
|                  |           |                         | MED LO                      | 22.8                             | 1150                                 | AFWUDL     |
|                  |           |                         | HI                          | 25.7                             | 1290                                 | AFWUDH     |
|                  |           | Cooling operation       | LO S                        | 0                                | —                                    | AFCUDS     |
|                  |           |                         | MED LO                      | 0                                | —                                    | AFCUDL     |
|                  |           |                         | HI                          | 25.7                             | 1100                                 | AFCUDH     |

# CHECKING THE INDOOR UNIT ELECTRICAL PARTS

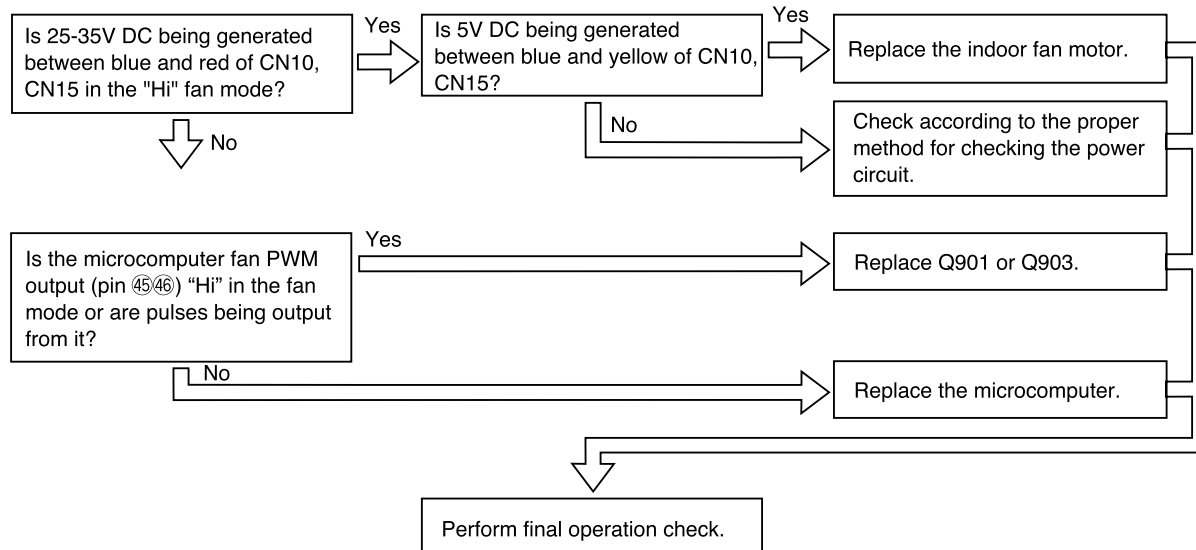
[Model : RAF-25NH4, RAF-50NH4, RAD-25QH4, RAD-40QH4]

## 1. Power does not come on (no operation)

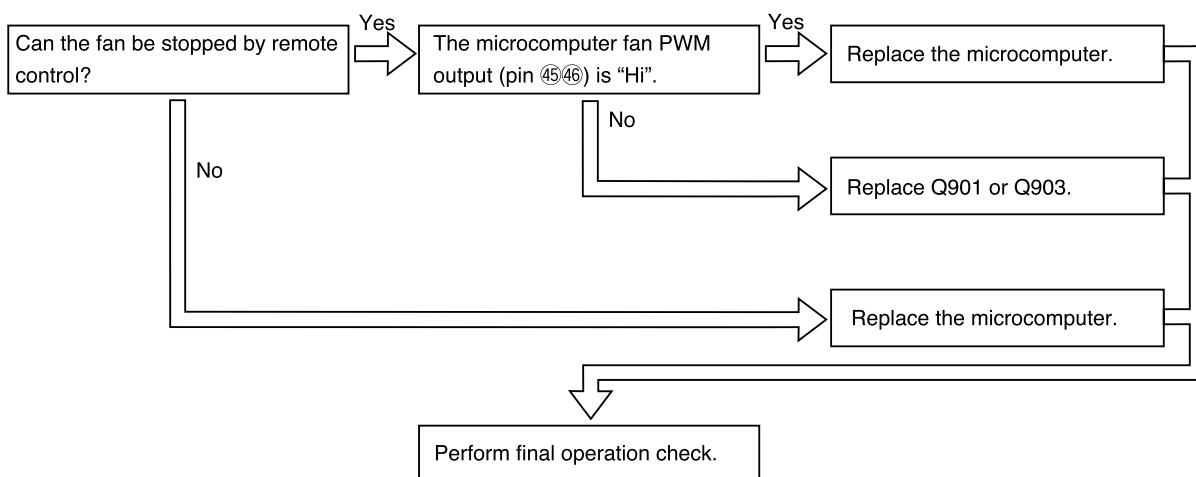




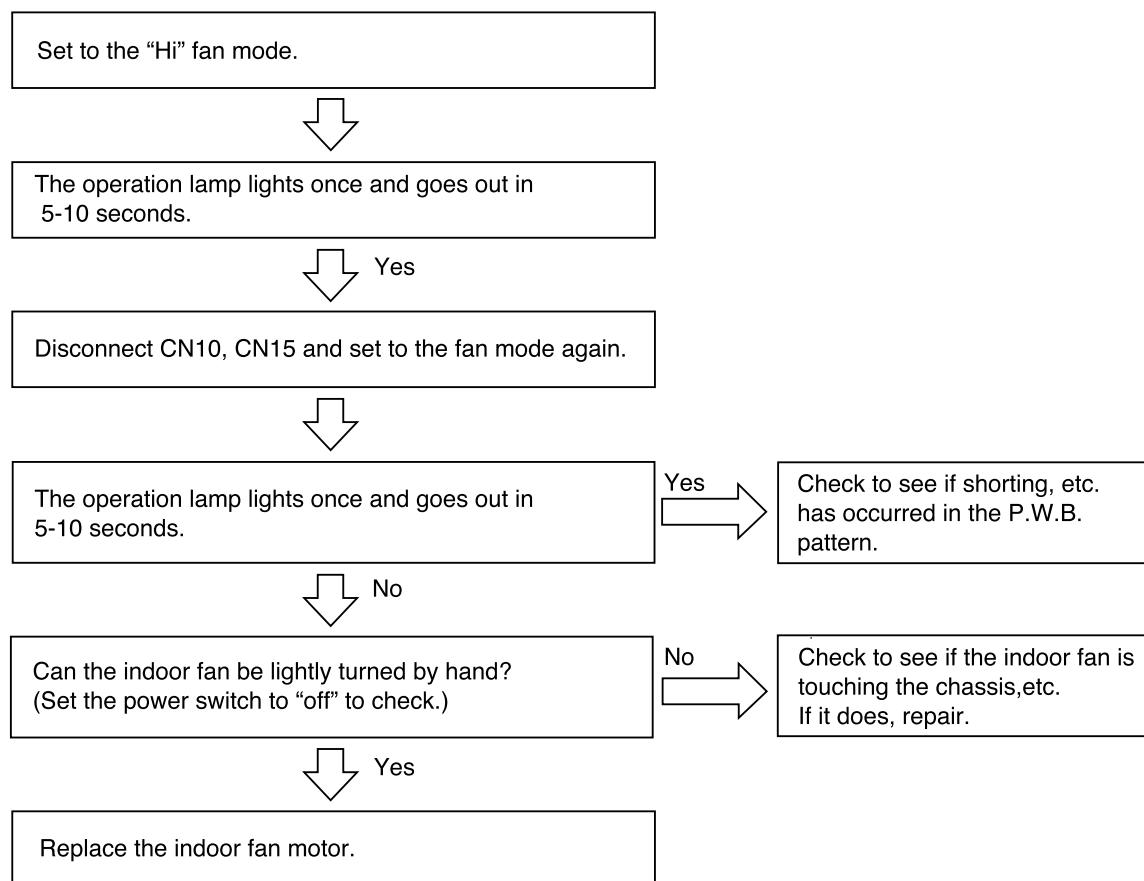
## 2. Only indoor fan does not operate (others are normal)



## 3. Indoor fan speed does not change (others are normal)

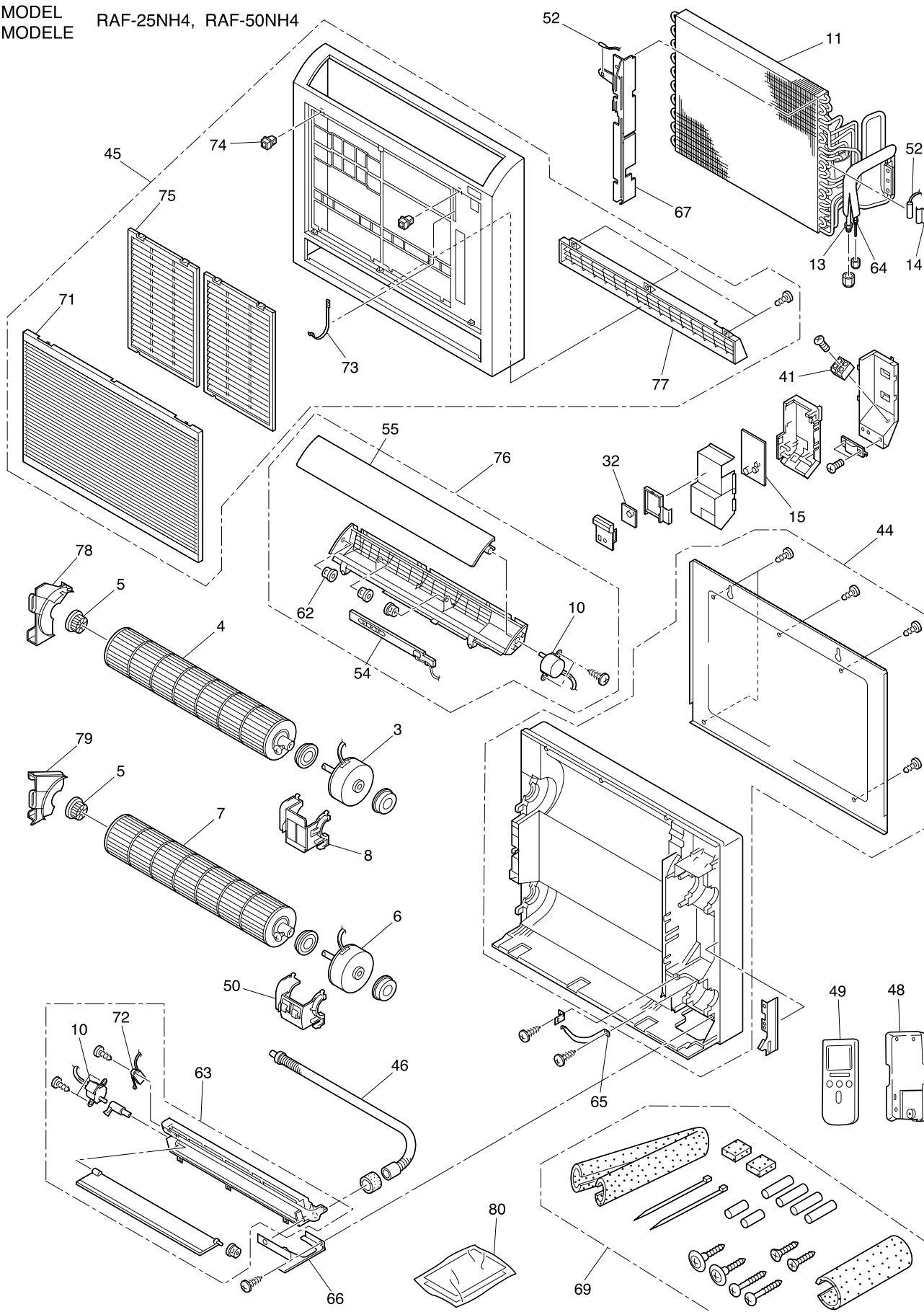


4. All systems stop from several seconds to several minutes after operation is started  
(all indicators are also off)



# PARTS LIST AND DIAGRAM LISTE DES PIÈCES DE RECHANGE

MODEL RAF-25NH4, RAF-50NH4  
MODELE



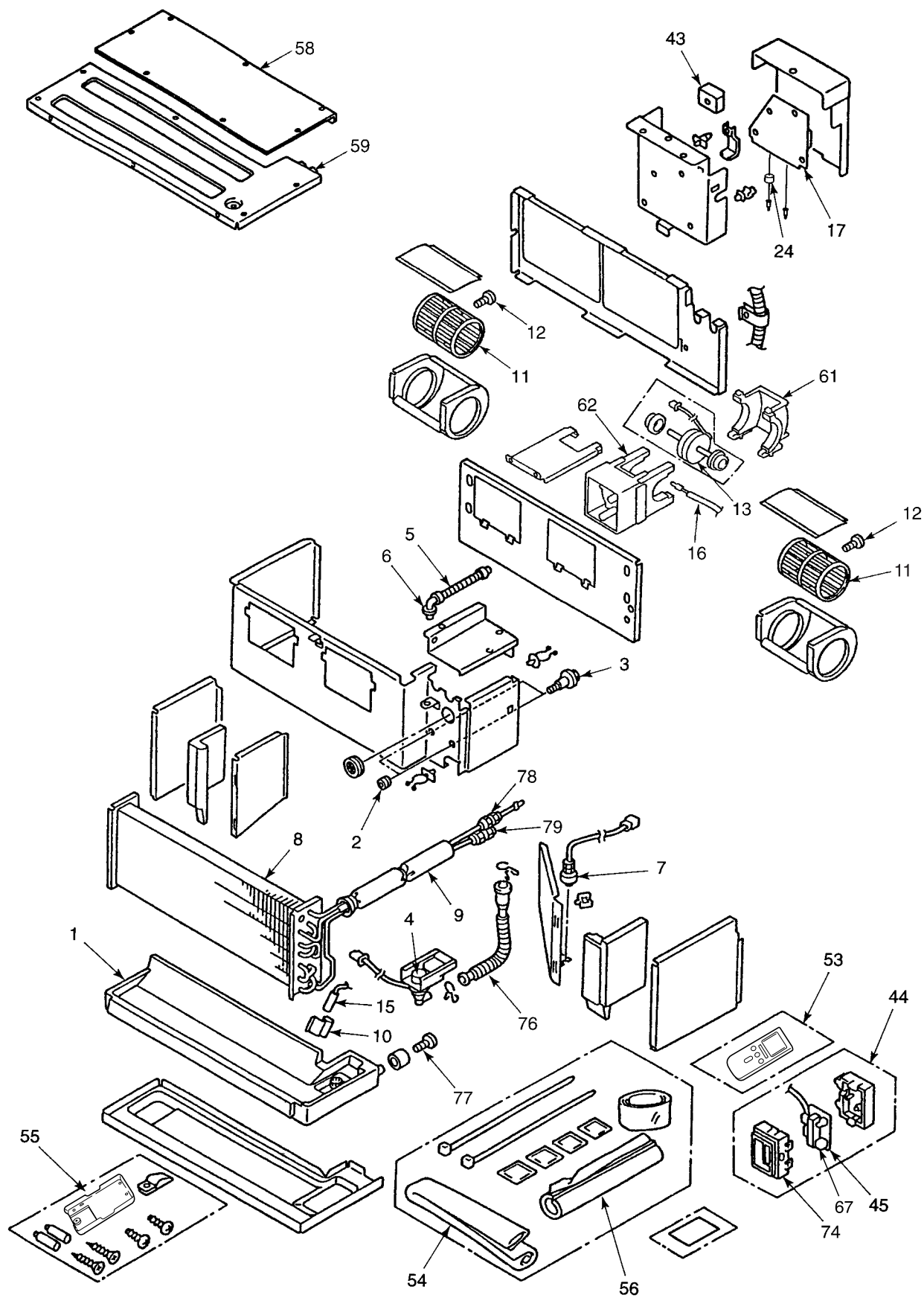
| NO.<br>N° | PARTS NO.<br>N° DE PIÈCE<br>RAF-25NH4 | Q'TY/<br>UNIT<br>QTÉ/<br>UNITÉ | PARTS NAME                | DÉSIGNATION                                      |
|-----------|---------------------------------------|--------------------------------|---------------------------|--------------------------------------------------|
| 3         | ATI-0972B 902                         | 1                              | FAN MOTOR (UPPER)         | MOTEUR DE VENTILATEUR (SUPERIEUR)                |
| 4         | ATI-0972B 903                         | 1                              | TANGENTIAL FAN (UPPER)    | VENTILATEUR TANGENTIEL (SUPERIEUR)               |
| 5         | RAS4010LX2 010                        | 2                              | FAN SUPPORT ASSEMBLY      | SUPPORT DE VENTILATEUR                           |
| 6         | ATI-0972B 905                         | 1                              | FAN MOTOR (LOWER)         | MOTEUR DE VENTILATEUR (INFERIEUR)                |
| 7         | ATI-0972B 906                         | 1                              | TANGENTIAL FAN (LOWER)    | VENTILATEUR TANGENTIEL (INFERIEUR)               |
| 8         | ATI-0972B 904                         | 1                              | FAN MOTOR SUPPORT (UPPER) | SUPPORT DE MOTEUR DE VENTILATEUR (SUPERIEUR)     |
| 10        | RAS-2810NX 045                        | 2                              | AUTO SWEEP MOTOR          | MOTEUR DE BALAYAGE AUTOMOTIQUE                   |
| 11        | RAF-25NH4 902                         | 1                              | HEAT EXCHANGER ASSEMBLY   | ASSEMBLÉE D'THERMISTANCE D'EXCHANGEUR DE CHALEUR |
| 13        | RAS-287AX 802                         | 1                              | UNION (3)                 | RACCORD UNION (3)                                |
| 14        | ATI-0972B 935                         | 1                              | BULB SUPPORT              | SUPPORT DE BULBE                                 |
| 15        | RAF-25NH4 903                         | 1                              | P.W.B. (MAIN)             | CIRCUIT IMPRIME (PRINCIPAL)                      |
| 32        | ATI-0972B 914                         | 1                              | P.W.B. (SWITCH)           | CIRCUIT IMPRIME (INTERRUPTEUR)                   |
| 41        | ATI-0972B 936                         | 1                              | TERMINAL BORD (2P)        | BORNIER DE RACCORDEMENT (2P)                     |
| 44        | RAF-25NH4 901                         | 1                              | CABINET                   | COFFRET                                          |
| 45        | RAF-25NH4 906                         | 1                              | FRONT COVER ASSEMBLY      | CAPOT AVANT                                      |
| 46        | KFR47GBPM 907                         | 1                              | DRAIN HOSE                | FLEXIBLE DE VIDANGE                              |
| 48        | RAS-258JX 004                         | 1                              | REMOTE CONTROL SUPPORT    | SUPPORT DE TELECOMMANDE                          |
| 49        | RAD-25QH4 905                         | 1                              | REMOTE CONTROL ASSEMBLY   | TELECOMMANDE                                     |
| 50        | ATI-0972B 912                         | 1                              | FAN MOTOR SUPPORT (LOWER) | SUPPORT DE MOTEUR DE VENTILATEUR (INFERIEUR)     |
| 52        | ATI-0972B 915                         | 1                              | THERMISTOR                | THERMISTANCE                                     |
| 54        | RAF-25NH4 905                         | 1                              | P.W.B. (INDICATION)       | CIRCUIT IMPRIME (INDICATION)                     |
| 55        | RAF-25NH4 909                         | 1                              | WIDE DEFLECTOR            | DÉFLECTEUR LARGE                                 |
| 62        | RAS-3610LX 003                        | 3                              | DEFLECTOR SUPPORT         | APPUI DE DÉFLECTEUR                              |
| 63        | ATI-0972B 917                         | 1                              | DISCHARGE FRAME           | ARMATURÉ DE DISCHARGE                            |
| 64        | RAS-2810KX 009                        | 1                              | UNION (2)                 | RACCORD UNION (2)                                |
| 65        | ATI-0972B 925                         | 1                              | PIPE BAND                 | BANDE DE PIPE                                    |
| 66        | ATI-0972B 926                         | 1                              | RAT PREVENTION COVER      | COUVERTURE DE PREBENTION DE RAT                  |
| 67        | ATI-0972B 927                         | 1                              | PIPE COVER                | COUVERTURE DE PIPE                               |

| NO.<br>N° | PARTS NO.<br>N° DE PIÈCE<br>RAF-25NH4 | Q'TY/<br>UNIT<br>QTÉ/<br>UNITÉ | PARTS NAME             | DÉSIGNATION                           |
|-----------|---------------------------------------|--------------------------------|------------------------|---------------------------------------|
| 69        | ATI-0972B 929                         | 1                              | ACCESSARIES ASSEMBLY   | ASSEMBLÉE D'ACCESSARIES               |
| 71        | RAF-25NH4 907                         | 1                              | FRONT PANEL            | PANNEAU FRONTAL                       |
| 72        | ATI-0972B 932                         | 1                              | DAMPER LIMIT SWITCH    | INTERRUPTEUR LIMITEUR DU DÉFLECTEUR   |
| 73        | ATI-0972B 933                         | 1                              | BAND (FOR FRONT PANEL) | BAND (POUR LE PANNEAU AVANT)          |
| 74        | RAP-5CPJ 004                          | 2                              | LATCH 1 (FRONT COVER)  | VERROU 1 (CAPOT AVANT)                |
| 75        | ATI-0972B 934                         | 2                              | AIR FILTER             | FILTRE A AIR                          |
| 76        | RAF-25NH4 904                         | 1                              | TOP FRAME              | ARMATURE SUPÉRIEURE                   |
| 77        | RAF-25NH4 908                         | 1                              | DISCHARGE GRILL        | GRILLE DE DECHARGE                    |
| 78        | ATI-0972B 922                         | 1                              | FAN COVER (UPPER)      | COUVERTURE DE VENTILATEUR (SUPÉRIEUR) |
| 79        | ATI-0972B 923                         | 1                              | FAN COVER (LOWER)      | COUVERTURE DE VENTILATEUR (INFÉRIEUR) |

| NO.<br>N° | PARTS NO.<br>N° DE PIÈCE<br>RAF-50NH4 | Q'TY/<br>UNIT<br>QTÉ/<br>UNITÉ | PARTS NAME                | DÉSIGNATION                                      |
|-----------|---------------------------------------|--------------------------------|---------------------------|--------------------------------------------------|
| 3         | ATI-0972B 902                         | 1                              | FAN MOTOR (UPPER)         | MOTEUR DE VENTILATEUR (SUPERIEUR)                |
| 4         | ATI-0972B 903                         | 1                              | TANGENTIAL FAN (UPPER)    | VENTILATEUR TANGENTIEL (SUPERIEUR)               |
| 5         | RAS4010LX2 010                        | 2                              | FAN SUPPORT ASSEMBLY      | SUPPORT DE VENTILATEUR                           |
| 6         | ATI-0972B 905                         | 1                              | FAN MOTOR (LOWER)         | MOTEUR DE VENTILATEUR (INFERIEUR)                |
| 7         | ATI-0972B 906                         | 1                              | TANGENTIAL FAN (LOWER)    | VENTILATEUR TANGENTIEL (INFERIEUR)               |
| 8         | ATI-0972B 904                         | 1                              | FAN MOTOR SUPPORT (UPPER) | SUPPORT DE MOTEUR DE VENTILATEUR (SUPERIEUR)     |
| 10        | RAS-2810NX 045                        | 2                              | AUTO SWEEP MOTOR          | MOTEUR DE BALAYAGE AUTOMATIQUE                   |
| 11        | ATI-0972B 907                         | 1                              | HEAT EXCHANGER ASSEMBLY   | ASSEMBLÉE D'THERMISTANCE D'EXCHANGEUR DE CHALEUR |
| 13        | RAS4010KX2 008                        | 1                              | UNION (4)                 | RACCORD UNION (4)                                |
| 14        | ATI-0972B 935                         | 1                              | BULB SUPPORT              | SUPPORT DE BULBE                                 |
| 15        | RAF-50NH4 901                         | 1                              | P.W.B. (MAIN)             | CIRCUIT IMPRIME (PRINCIPAL)                      |
| 32        | ATI-0972B 914                         | 1                              | P.W.B. (SWITCH)           | CIRCUIT IMPRIME (INTERRUPTEUR)                   |
| 41        | ATI-0972B 936                         | 1                              | TERMINAL BORD (2P)        | BORNIER DE RACCORDEMENT (2P)                     |
| 44        | RAF-25NH4 901                         | 1                              | CABINET                   | COFFRET                                          |
| 45        | RAF-25NH4 906                         | 1                              | FRONT COVER ASSEMBLY      | CAPOT AVANT                                      |
| 46        | KFR47GBPM 907                         | 1                              | DRAIN HOSE                | FLEXIBLE DE VIDANGE                              |
| 48        | RAS-258JX 004                         | 1                              | REMOTE CONTROL SUPPORT    | SUPPORT DE TELECOMMANDE                          |
| 49        | RAD-25QH4 905                         | 1                              | REMOTE CONTROL ASSEMBLY   | TELECOMMANDE                                     |
| 50        | ATI-0972B 912                         | 1                              | FAN MOTOR SUPPORT (LOWER) | SUPPORT DE MOTEUR DE VENTILATEUR (INFERIEUR)     |
| 52        | ATI-0972B 915                         | 1                              | THERMISTOR                | THERMISTANCE                                     |
| 54        | RAF-25NH4 905                         | 1                              | P.W.B. (INDICATION)       | CIRCUIT IMPRIME (INDICATION)                     |
| 55        | RAF-25NH4 909                         | 1                              | WIDE DEFLECTOR            | DÉFLECTEUR LARGE                                 |
| 62        | RAS-3610LX 003                        | 3                              | DEFLECTOR SUPPORT         | APPUL DE DÉFLECTEUR                              |
| 63        | ATI-0972B 917                         | 1                              | DISCHARGE FRAME           | ARMATURÉ DE DISCHARGE                            |
| 64        | RAS-2810KX 009                        | 1                              | UNION (2)                 | RACCORD UNION (2)                                |
| 65        | ATI-0972B 925                         | 1                              | PIPE BAND                 | BANDE DE PIPE                                    |
| 66        | ATI-0972B 926                         | 1                              | RAT PREVENTION COVER      | COUVERTURE DE PREBENTION DE RAT                  |
| 67        | ATI-0972B 927                         | 1                              | PIPE COVER                | COUVERTURE DE PIPE                               |

| NO.<br>N° | PARTS NO.<br>N° DE PIÈCE<br>RAF-50NH4 | Q'TY/<br>UNIT<br>QTÉ/<br>UNITÉ | PARTS NAME             | DÉSIGNATION                           |
|-----------|---------------------------------------|--------------------------------|------------------------|---------------------------------------|
| 69        | ATI-0972B 929                         | 1                              | ACCESSARIES ASSEMBLY   | ASSEMBLÉE D'ACCESSARIES               |
| 71        | RAF-25NH4 907                         | 1                              | FRONT PANEL            | PANNEAU FRONTAL                       |
| 72        | ATI-0972B 932                         | 1                              | DAMPER LIMIT SWITCH    | INTERRUPTEUR LIMITEUR DU DÉFLECTEUR   |
| 73        | ATI-0972B 933                         | 1                              | BAND (FOR FRONT PANEL) | BAND (POUR LE PANNEAU AVANT)          |
| 74        | RAP-5CPJ 004                          | 2                              | LATCH 1 (FRONT COVER)  | VERROU 1 (CAPOT AVANT)                |
| 75        | ATI-0972B 934                         | 2                              | AIR FILTER             | FILTRE A AIR                          |
| 76        | RAF-25NH4 904                         | 1                              | TOP FRAME              | ARMATURE SUPÉRIEURE                   |
| 77        | RAF-25NH4 908                         | 1                              | DISCHARGE GRILL        | GRILL DE DECHARGE                     |
| 78        | ATI-0972B 922                         | 1                              | FAN COVER (UPPER)      | COUVERTURE DE VENTILATEUR (SUPÉRIEUR) |
| 79        | ATI-0972B 923                         | 1                              | FAN COVER (LOWER)      | COUVERTURE DE VENTILATEUR (INFÉRIEUR) |

MODEL RAD-25QH4, RAD-40QH4  
 MODELE



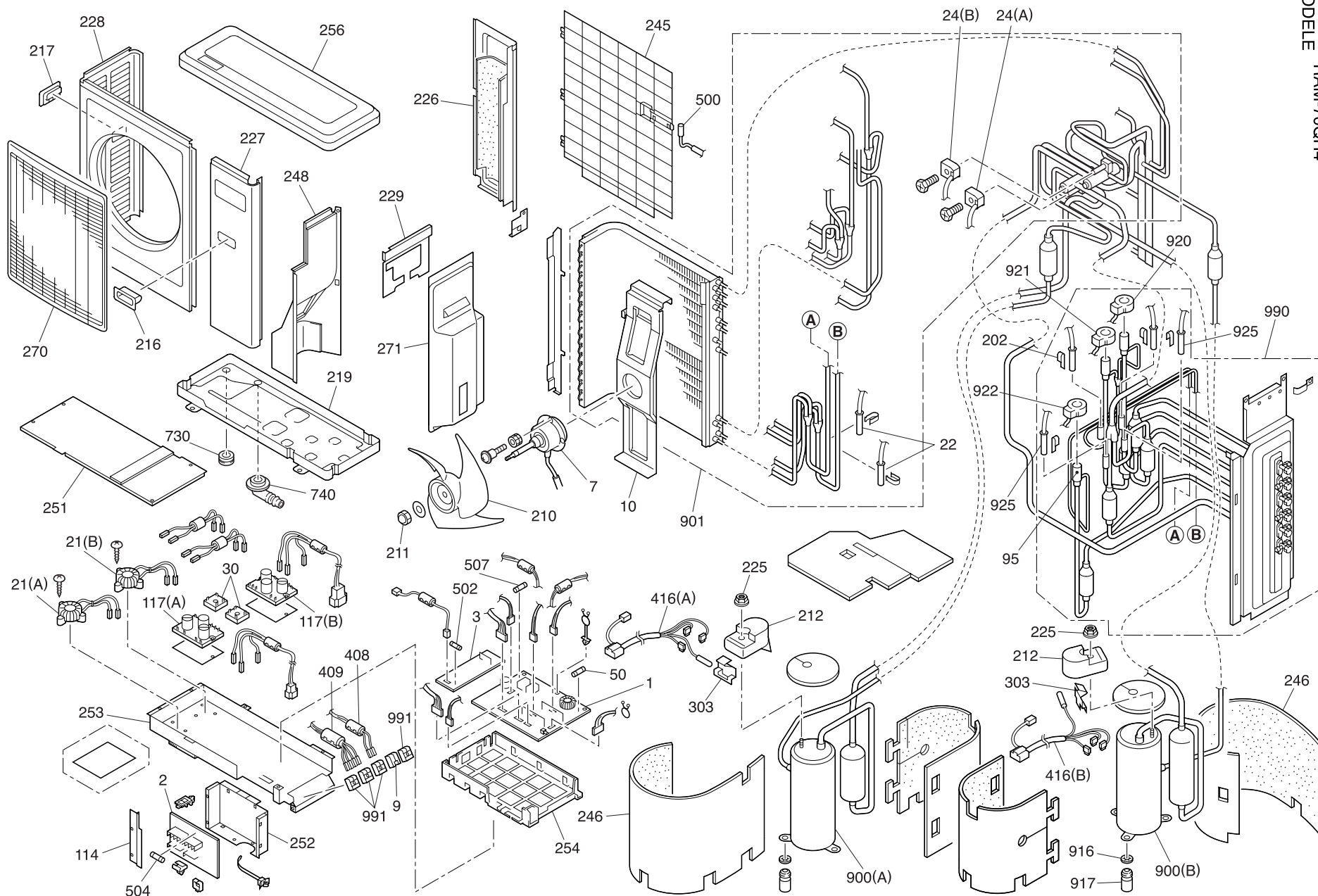


| NO.<br>N° | PARTS NO.<br>N° DE PIÈCE<br>RAD-25QH4 | Q'TY/<br>UNIT<br>QTÉ/<br>UNITÉ | PARTS NAME               | DÉSIGNATION                                 |
|-----------|---------------------------------------|--------------------------------|--------------------------|---------------------------------------------|
| 1         | RAD-28MX 001                          | 1                              | DRAIN PAN                | BAC DE CONDENSATS                           |
| 2         | RAMD-350BW 003                        | 2                              | FAN MOTOR SUPPORT RUBBER | SUPPORT DE MOTEUR DE VENTILATEUR CAOUTCHOUE |
| 3         | RAMD-350BW 004                        | 2                              | SPECIAL SCREW            | VIS SPECIALE                                |
| 4         | RAMD-28GX 002                         | 1                              | PUMP ASSEMBLY            | POMPE                                       |
| 5         | RAMD-350BW 010                        | 1                              | DRAIN HOSE               | FLEXIBLE DE VIDANGE                         |
| 6         | RAMD-350BW 009                        | 1                              | PUMP HOSE                | TUYAU DE POMPE                              |
| 7         | RAMD-350BW 011                        | 1                              | FLOAT SWITCH             | INTERRUPTEUR A FLOTTEUR                     |
| 8         | RAD-28MX 801                          | 1                              | EVAPORATOR ASSEMBLY      | EVAPORATEUR                                 |
| 9         | RAD-28MX 802                          | 1                              | PIPE SET                 | JEU DE TUYAUX                               |
| 10        | RAD-25QH4 906                         | 1                              | BULB SUPPORT             | SUPPORT DE BULBE                            |
| 11        | RAD-32CNH2 906                        | 2                              | SIROCCO FAN              | VENTILATEUR SIROCCO                         |
| 12        | RA-353B 004                           | 2                              | FAN BOLT                 | BOULON DE VENTILATEUR                       |
| 13        | RAD-32CNH2 905                        | 1                              | FAN MOTOR 20W, 1kg       | MOTEUR DE VENTILATEUR 20W, 0,9kg            |
| 15        | RAMD-40GX 002                         | 1                              | THERMISTOR (HEAT)        | THERMISTANCE (CHALEUR)                      |
| 16        | RAD-28MX 005                          | 1                              | THERMISTOR (TEMPERATURE) | THERMISTANCE (TEMPERATURE)                  |
| 17        | RAD-25QH4 902                         | 1                              | P.W.B. (MAIN)            | CIRCUIT IMPRIME (PRINCIPAL)                 |
| 24        | RAC4010KX2 008                        | 1                              | FERITE CORE (935)        | NOYAU EN FERRITE (935)                      |
| 31        | RAC-228JX 014                         | 2                              | SLIDE SWITCH             | INTERRUPTEUR A COULISSE                     |
| 34        | RAS-2236W 071                         | 1                              | LED-RED (SEL2213C)       | LED-ROUGE (SEL2213C)                        |
| 43        | RAC2843CNH 902                        | 1                              | TERMINAL BOARD (2P)      | BORNIER DE RACCORDEMENT (2P)                |
| 44        | RAD-25QH4 903                         | 1                              | INDICATION ASSEMBLY      | ASSEMBLEE D'INDICATION                      |
| 45        | DSI25S 901                            | 1                              | P.W.B. (INDICATION)      | CIRCUIT IMPRIME (INDICATION)                |
| 53        | RAD-25QH4 905                         | 1                              | REMOTE CONTROL ASSEMBLY  | TELECOMMANDE                                |
| 54        | RAMJ-250BW 009                        | 1                              | INSULATOR PIPE           | CANALISATION DE ISOLANT                     |
| 55        | RAS-258JX 004                         | 1                              | REMOCON SUPPORT          | SUPPORT DE TELECOMMANDE                     |
| 56        | RAD-28MX 009                          | 1                              | INSULATOR PIPE (236L)    | CANALISATION DE ISOLANT (236L)              |
| 58        | RAD-28QH1 904                         | 1                              | UPPER PLATE (2)          | PLAT SUPÉRIEUR (2)                          |
| 59        | RAD-25QH4 904                         | 1                              | UPPER PLATE (1)          | PLAT SUPÉRIEUR (1)                          |

| NO.<br>N° | PARTS NO.<br>N° DE PIÈCE<br>RAD-25QH4 | Q'TY/<br>UNIT<br>QTÉ/<br>UNITÉ | PARTS NAME               | DÉSIGNATION                    |
|-----------|---------------------------------------|--------------------------------|--------------------------|--------------------------------|
| 61        | RAD-28QH1 907                         | 1                              | FAN MOTOR SUPPORT        | SUPPORT DE VENTILATEUR         |
| 62        | RAD-25QH4 901                         | 1                              | BASE (FAN MOTOR)         | BASE (MOTEUR DE VENTILATEUR)   |
| 66        | RAS-2236W 025                         | 1                              | LED-YELLOW (SEL2713K)    | LED-JAUNE (SEL2713K)           |
| 67        | RAS-25DXD 002                         | 1                              | LIGHT RECEIVING UNIT     | MODULE DE RECEPTION DE LUMIERE |
| 68        | RAS-2553W 020                         | 1                              | LED-GREEN (SEL2413E)     | LED-VERTE (SEL2413E)           |
| 69        | RAS-2810KX 043                        | 1                              | CURRENT PROTECTOR (0.8A) | PROTECTEUR COURANT (0,8A)      |
| 70        | RAS-2810KX 044                        | 1                              | CURRENT PROTECTOR (2.0A) | PROTECTEUR COURANT (2,0A)      |
| 74        | RAMJ-250BW 005                        | 1                              | LED COVER                | CAPOT DEL                      |
| 76        | RAD-28MX 003                          | 1                              | DRAIN PIPE               | TUYAU DE VIDANGE               |
| 77        | RAS5645TWU 008                        | 1                              | DRAIN CAP                | VIDANGEZ LA PAC                |
| 78        | RAS-287AX 801                         | 1                              | UNION (2)                | RACCORD UNION (2)              |
| 79        | RAS-287AX 802                         | 1                              | UNION (3)                | RACCORD UNION (3)              |

| NO.<br>N° | PARTS NO.<br>N° DE PIÈCE<br>RAD-40QH4 | Q'TY/<br>UNIT<br>QTÉ/<br>UNITÉ | PARTS NAME               | DÉSIGNATION                                  |
|-----------|---------------------------------------|--------------------------------|--------------------------|----------------------------------------------|
| 1         | RAD-28MX 001                          | 1                              | DRAIN PAN                | BAC DE CONDENSATS                            |
| 2         | RAMD-350BW 003                        | 2                              | FAN MOTOR SUPPORT RUBBER | SUPPORT DE MOTEUR DE VENTILATEUR CAOUTCHOUTE |
| 3         | RAMD-350BW 004                        | 2                              | SPECIAL SCREW            | VIS SPECIALE                                 |
| 4         | RAD-28MX 002                          | 1                              | ASSEMBLY PUMP            | POMPE                                        |
| 5         | RAMD-350BW 010                        | 1                              | DRAIN HOSE               | FLEXIBLE DE VIDANGE                          |
| 6         | RAMD-350BW 009                        | 1                              | PUMP HOSE                | TUYAU DE POMPE                               |
| 7         | RAMD-350BW 011                        | 1                              | FLOAT SWITCH             | INTERRUPTEUR A FLOTTEUR                      |
| 8         | RAD-28MX 801                          | 1                              | EVAPORATOR ASSEMBLY      | EVAPORATEUR                                  |
| 9         | RAD-28MX 802                          | 1                              | PIPE SET                 | JEU DE TUYAUX                                |
| 10        | RAD-28QH4 906                         | 1                              | BULB SUPPORT             | SUPPORT DE BULBE                             |
| 11        | RAD-32CNH2 906                        | 2                              | SIROCCO FAN              | VENTILATEUR SIROCCO                          |
| 12        | RA-353B 004                           | 2                              | FAN BOLT                 | BOULON DE VENTILATEUR                        |
| 13        | RAD-32CNH2 905                        | 1                              | FAN MOTOR 20W, 1KG       | MOTEUR DE VENTILATEUR 20W, 1KG               |
| 15        | RAMD-40GX 002                         | 1                              | THERMISTOR (HEAT)        | THERMISTANCE (CHALEUR)                       |
| 16        | RAD-28MX 005                          | 1                              | THERMISTOR (TEMPERATURE) | THERMISTANCE (TEMPERATURE)                   |
| 17        | RAD-40QH4 901                         | 1                              | P.W.B. (MAIN)            | CIRCUIT IMPRIME (PRINCIPAL)                  |
| 24        | RAC4010KX2 008                        | 1                              | FERITE CORE (935)        | NOYAU EN FERRITE (935)                       |
| 31        | RAC-228JX 014                         | 2                              | SLIDE SWITCH             | INTERRUPTEUR A COULISSE                      |
| 34        | RAS-2236W 071                         | 1                              | LED-RED (SEL2213C)       | DEL-ROUGE (SEL2213C)                         |
| 43        | RAC2843CNH 902                        | 1                              | TERMINAL BOARD (2P)      | BORNIER DE RACCORDEMENT (2P)                 |
| 44        | RAD-28QH4 903                         | 1                              | INDICATION ASSEMBLY      | ASSEMBLEE D'INDICATION                       |
| 45        | DSI25S 901                            | 1                              | P.W.B. (INDICATION)      | CIRCUIT IMPRIME (INDICATION)                 |
| 53        | RAD-28QH4 905                         | 1                              | REMOTE CONTROL ASSEMBLY  | TELECOMMANDE                                 |
| 54        | RAMJ-250BW 009                        | 1                              | INSULATOR PIPE           | CANNALISATION DE ISOLANT                     |
| 55        | RAS-258JX 004                         | 1                              | REMOTE CONTROL SUPPORT   | SUPPORT DE TELECOMMANDE                      |
| 56        | RAD-28MX 009                          | 1                              | INSULATOR PIPE (236L)    | CANALISATION DE ISOLANT (236L)               |
| 58        | RAD-28QH1 904                         | 1                              | UPPER PLATE (2)          | PLAT SUPÉRIEUR (2)                           |
| 59        | RAD-25QH4 904                         | 1                              | UPPER PLATE (1)          | PLAT SUPÉRIEUR (1)                           |

| NO.<br>N° | PARTS NO.<br>N° DE PIÈCE<br>RAD-40QH4 | Q'TY/<br>UNIT<br>QTÉ/<br>UNITÉ | PARTS NAME | DÉSIGNATION              |                                  |
|-----------|---------------------------------------|--------------------------------|------------|--------------------------|----------------------------------|
| 61        | RAD-28QH1                             | 907                            | 1          | FAN MOTOR SUPPORT        | SUPPORT DE MOTEUR DE VENTILATEUR |
| 62        | RAD-25QH4                             | 901                            | 1          | BESE (FAN MOTOR)         | BASE (MOTEUR DE VENTILATEUR)     |
| 66        | RAS-2236W                             | 025                            | 1          | LED-YELLOW (SEL2713K)    | DEL-JAUNE (SEL2713K)             |
| 67        | RAS-25DXD                             | 002                            | 1          | LIGHT RECEIVING UNIT     | MODULE DE RECEPTION DE LUMIERE   |
| 68        | RAS-2553W                             | 020                            | 1          | LED-GREEN (SEL2413E)     | DEL-VERTE (SEL2413E)             |
| 69        | RAS-2810KX                            | 043                            | 1          | CURRENT PROTECTOR (0.8A) | PROTECTEUR COURANT (0,8A)        |
| 70        | RAS-2810KX                            | 044                            | 1          | CURRENT PROTECTOR (2.0A) | PROTECTEUR COURANT (2,0A)        |
| 74        | RAMJ-250BW                            | 005                            | 1          | LED COVER                | CAPOT DEL                        |
| 76        | RAD-28MX                              | 003                            | 1          | DRAIN PIPE               | TUYAU DE VIDANGE                 |
| 77        | RAS5645TWU                            | 008                            | 1          | DRAIN CAP                | VIDANGEZ LA PAC                  |
| 78        | RAS-287AX                             | 801                            | 1          | UNION (2)                | RACCORD UNION (2)                |
| 79        | RAS-287AX                             | 802                            | 1          | UNION (3)                | RACCORD UNION (3)                |

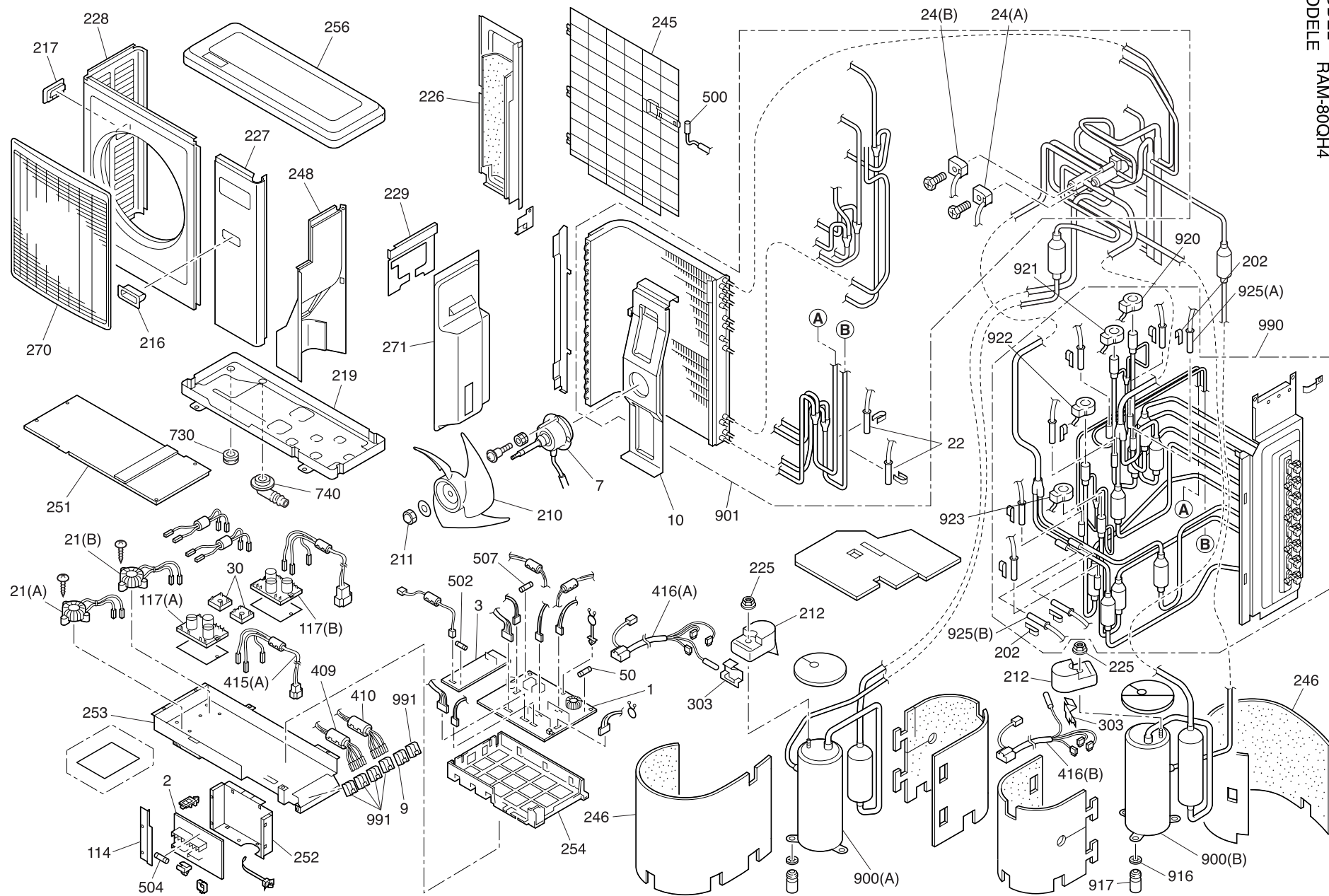


| NO.<br>N° | PARTS NO.<br>N° DE PIÈCE<br>RAM-70QH4 | Q'TY/<br>UNIT<br>QTÉ/<br>UNITÉ | PARTS NAME                   | DÉSIGNATION                      |
|-----------|---------------------------------------|--------------------------------|------------------------------|----------------------------------|
| 1         | RAM-70QH4 906                         | 1                              | P.W.B. (MAIN)                | CIRCUIT IMPRIME (PRINCIPAL)      |
| 2         | RAM-70QH4 908                         | 1                              | P.W.B. (SWITCH)              | CIRCUIT IMPRIME (INTERRUPTEUR)   |
| 3         | RAM-70QH4 907                         | 1                              | P.W.B. (FAN)                 | CRICUIT IMPRIME (VENTILATEUR)    |
| 7         | RAC-80G4X2 007                        | 1                              | FAN MOTOR 50W, 4kg           | MOTEUR DE VENTILATEUR 50W, 4kg   |
| 9         | RAC-P28KX2 003                        | 1                              | TERMINAL BOARD (2P)          | BORNIER DE RACCORDEMENT          |
| 10        | RAC68N3X2S 050                        | 1                              | FAN MOTOR SUPPORT            | SUPPORT DE MOTEUR DE VENTILATEUR |
| 21        | RAC-2210MX 011                        | 1                              | REACTOR (B)                  | REACTANCE (B)                    |
| 21        | RAM-50QH1 902                         | 1                              | REACTOR (A)                  | REACTANCE (A)                    |
| 22        | RAC68N3X2S 035                        | 1                              | THERMISTOR (DEFROST(BLE))    | THERMISTANCE (DEGIVRAGE(BLE))    |
| 22        | RAC68N3X2S 036                        | 1                              | THERMISTOR (DEFROST(BLK))    | THERMISTANCE (DEGIVRAGE(BLK))    |
| 24        | RAC68N3X2S 032                        | 1                              | COIL (REVERSING VALVE) (B)   | BOBINE (VANNE D'INVERSION) (B)   |
| 24        | RAC68N3X2S 033                        | 1                              | COIL (REVERSING VALVE) (A)   | BOBINE (VANNE D'INVERSION) (A)   |
| 30        | RAC-22SHX2 006                        | 2                              | DIODE STACK                  | JEU DE DIODES                    |
| 50        | RAC-40FNH1 904                        | 1                              | FUSE (25A)                   | FUSIBLE (25A)                    |
| 95        | RAC68N3X2S 029                        | 1                              | ELECTRIC EXPANSION VALVE (B) | VANNE D'EXPANSION ÉLECTRIQUE (B) |
| 114       | RAC68N3X2S 010                        | 1                              | COVER (RAIN)                 | COUVETURE (PLUIE)                |
| 117       | RAC68N3X2S 007                        | 1                              | P.W.B. (SPM2-A)              | CIRCUIT IMPRIME (SPM2-A)         |
| 117       | RAC68N3X2S 008                        | 1                              | P.W.B. (SPM2-B)              | CIRCUIT IMPRIME (SPM2-B)         |
| 202       | RAS-408CX2 023                        | 4                              | BULB SUPPORT                 | SUPPORT DE BUBLE                 |
| 210       | RAC-68G3X2 012                        | 1                              | PROPELLER FAN                | SOUFFLERIE A HELICE              |
| 211       | ACPC56L2X2 020                        | 1                              | NUT (PROPELLER FAN)          | ECROU (SOUFFLERIE A HELICE )     |
| 212       | RAC-2210MX 005                        | 2                              | O.L.R. COVER                 | CAPOT O.L.R.                     |
| 216       | RAC-1807V 002                         | 1                              | HANDLE                       | POIGNEE                          |
| 217       | RAC-2567HV 006                        | 1                              | HANDLE (LEFT)                | POIGNEE                          |
| 219       | RAM-70QH4 901                         | 1                              | BASE                         | BASE                             |
| 225       | RAC-2209LX 007                        | 2                              | NUT FOR O.L.R. COVER         | NUT (O.L.R. COVER)               |
| 226       | RAC68N3X2S 044                        | 1                              | PANEL (BACK)                 | PANNEAU (ARRIÈRE)                |
| 227       | RAM-70QH4 910                         | 1                              | PANEL (FRONT)                | PANNEAU (AVENT)                  |

| NO.<br>N° | PARTS NO.<br>N° DE PIÈCE<br>RAM-70QH4 | Q'TY/<br>UNIT<br>QTÉ/<br>UNITÉ | PARTS NAME | DÉSIGNATION                       |                                            |
|-----------|---------------------------------------|--------------------------------|------------|-----------------------------------|--------------------------------------------|
| 228       | RAC-80GW3                             | 005                            | 1          | CABINET                           | COFFRET                                    |
| 229       | RAC68N3X2S                            | 045                            | 1          | PANEL (SIDE)                      | PANNEAU (CÔTÉ)                             |
| 245       | RAC68N3X2S                            | 042                            | 1          | FILTER                            | FILTRE                                     |
| 246       | RAC68N3X2S                            | 026                            | 1          | SOUNDPROOF COVER                  | COUVERTURE INSONORISÉE                     |
| 248       | RAM-70QH4                             | 903                            | 1          | PARTITION                         | CLOISON                                    |
| 251       | RAC68N3X2S                            | 056                            | 1          | UPPER PLATE (ELEC. BOX)           | PLAQUE SUPÉRIEURE (BOÎTE DE ÉLECTRIQUE)    |
| 252       | RAC68N3X2S                            | 009                            | 1          | ELECTRIC CASE                     | CAS ÉLECTRIQUE                             |
| 253       | RAM-70QH4                             | 904                            | 1          | ELECTRIC BOX                      | BOÎTE ÉLECTRIQUE                           |
| 254       | RAM-70QH4                             | 905                            | 1          | P.W.B. SUPPORT                    | SUPPORT DE CIRCUIT IMPRIMÉ                 |
| 256       | RAM-80HT                              | 904                            | 1          | TOP LID                           | COUVERCLE SUPÉRIEUR                        |
| 270       | RAC-80GW3                             | 006                            | 1          | GRILL                             | GILLE                                      |
| 271       | RAC68N3X2S                            | 047                            | 1          | SIDE COVER                        | COUVERTURE LATÉRALE                        |
| 303       | RAC-2810HX                            | 008                            | 2          | SUPPORT (OH-THERMISTOR)           | SUPPORT (OH-THERMISTANCE)                  |
| 408       | RAM-70QH4                             | 909                            | 1          | CORD (2P) FOR CN3                 | CORDE (2P) POUR CN3                        |
| 409       | RAM-70QH4                             | 912                            | 1          | CORD (4P) FOR CN2                 | CORDE (4P) POUR CN2                        |
| 416       | RAC68N3X2S                            | 027                            | 1          | OVER HEAT THERMISTOR ASSEMBLY (A) | ASSEMBLY (A) DE THERMISTANCE DE SURCHAUFFE |
| 416       | RAC68N3X2S                            | 028                            | 1          | OVER HEAT THERMISTOR ASSEMBLY (B) | ASSEMBLY (B) DE THERMISTANCE DE SURCHAUFFE |
| 500       | RAC68N3X2S                            | 043                            | 1          | THERMISTOR (OUT TEMP.)            | THERMISTANCE (EXTERIEURE TEMPÉRATURE)      |
| 501       | HRC-25KX-1                            | 002                            | 5          | RELAY (FTR-F3)                    | RELAIS (FTR-F3)                            |
| 502       | R-S43MVP                              | 050                            | 1          | FUSE (2A)                         | FUSIBLE (2A)                               |
| 503       | R-235TX                               | 044                            | 2          | FUSE HOLDER                       | PORTE-FUSIBLES                             |
| 504       | RAC-206FD                             | 003                            | 1          | TUBE FUSE (3A)                    | FUSIBLE DE TUBE                            |
| 505       | RAC-25EX                              | 010                            | 2          | POWER RELAY (G4A)                 | RELAIS D'ALIMENTATION (G4A)                |
| 506       | RAC4010KX2                            | 008                            | 2          | FERITE CORE (935)                 | NOYAU EN FERRITE (935)                     |
| 507       | RAC68N3X2S                            | 053                            | 1          | FUSE (5A)                         | FUSIBLE (5A)                               |
| 508       | RAM-103CNH                            | 910                            | 2          | REGURATOR (MC7805CT)              | REGULATEUR (MC7805CT)                      |
| 509       | RAS-22DWC                             | 006                            | 1          | TEMPORARY SWITCH                  | INTERRUPTEUR AUXILIAIRE                    |
| 510       | RAS-226WI                             | 011                            | 2          | FUSE HOLDER                       | PORTE-FUSIBLES                             |

| NO.<br>N° | PARTS NO.<br>N° DE PIÈCE<br>RAM-70QH4 | Q'TY/<br>UNIT<br>QTÉ/<br>UNITÉ | PARTS NAME | DÉSIGNATION                    |                                   |
|-----------|---------------------------------------|--------------------------------|------------|--------------------------------|-----------------------------------|
| 511       | RAS-258EX                             | 043                            | 3          | COIL (RCH106-82K)              | BOBINE (RCH106-82K)               |
| 512       | RA108CHLXA                            | 908                            | 3          | VARISTOR (450NR)               | VARISTOR (450NR)                  |
| 730       | RAC-2210MX                            | 022                            | 1          | BUSH (BASE)                    | BUSH (BASE)                       |
| 740       | RAC-2810NX                            | 018                            | 1          | DRAIN PIPE                     | TUYAU DE VIDANGE                  |
| 900       | RAC69N3X2S                            | 801                            | 1          | COMPRESSOR (A)                 | COMPRESSEUR (A)                   |
| 900       | RAC69N3X2S                            | 802                            | 1          | COMPRESSOR (B)                 | COMPRESSEUR (B)                   |
| 901       | RAC69N3X2S                            | 803                            | 1          | CONDENSER                      | CONDENSEUR                        |
| 916       | KPNT1                                 | 001                            | 6          | PUSH NUT                       | ECROU A POUSSER                   |
| 917       | RAC-2226HV                            | 805                            | 6          | COMPRESSOR RUBBER              | BAGUE CAOUTCHOUTEE DE COMPRESSEUR |
| 920       | RAC68N3X2S                            | 037                            | 1          | COIL (BLUE, EXPANSION VALVE)   | BOBINE (BLEU, VANNE D'EXPANSION)  |
| 921       | RAC68N3X2S                            | 038                            | 1          | COIL (YELLOW, EXPANSION VALVE) | BOBINE (JAUNE, VANNE D'EXPANSION) |
| 922       | RAC68N3X2S                            | 039                            | 1          | COIL (RED, EXPANSION VALVE)    | BOBINE (ROUGE, VANNE D'EXPANSION) |
| 925       | RAC68N3X2S                            | 034                            | 1          | THERMISTOR PIPE                | THERMISTANCE TUBE                 |
| 990       | RAM-70QH4                             | 902                            | 1          | VALVE ASSEMBLY                 | VANNE                             |
| 991       | ATI-0972B                             | 936                            | 4          | TERMINAL BORD (2P)             | BORNIER DE RACCORDEMENT (2P)      |





| NO.<br>N° | PARTS NO.<br>N° DE PIÈCE<br>RAM-80QH4 | Q'TY/<br>UNIT<br>QTÉ/<br>UNITÉ | PARTS NAME                 | DÉSIGNATION                      |
|-----------|---------------------------------------|--------------------------------|----------------------------|----------------------------------|
| 1         | RAM-80QH4 901                         | 1                              | P.W.B. (MAIN)              | CIRCUIT IMPRIME (PRINCIPAL)      |
| 2         | RAM-80QH4 902                         | 1                              | P.W.B. (SWITCH)            | CIRCUIT IMPRIME (INTERRUPTEUR)   |
| 3         | RAM-70QH4 907                         | 1                              | P.W.B. (FAN)               | CIRCUIT IMPRIME (VENTILATEUR)    |
| 7         | RAC-80G4X2 007                        | 1                              | FAN MOTOR 50W, 4KG         | MOTEUR DE VENTILATEUR 50W, 4KG   |
| 9         | RAC-P28KX2 003                        | 1                              | TERMINAL BORD (2P)         | BORNIER DE RACCORDEMENT (2P)     |
| 10        | RAC68N3X2S 050                        | 1                              | FAN MOTOR SUPPORT          | SUPPORT DE MOTEUR DE VENTILATEUR |
| 21        | RAC-2210MX 011                        | 1                              | REACTOR (B)                | REACTANCE (B)                    |
| 21        | RAM-50QH1 902                         | 1                              | REACTOR (A)                | REACTANCE (A)                    |
| 22        | RAC68N3X2S 035                        | 1                              | THERMISTOR (DEFROST(BLE))  | THERMISTANCE (DEGIVRAGE(BLE))    |
| 22        | RAC68N3X2S 036                        | 1                              | THERMISTOR (DEFROST(BLK))  | THERMISTANCE (DEGIBRAGE(BLK))    |
| 24        | RAC68N3X2S 032                        | 1                              | COIL (REVERSING VALVE) (B) | BOBINE (VANNE D'INVERSION) (B)   |
| 24        | RAC68N3X2S 033                        | 1                              | COIL (REVERSING VALVE) (A) | BOBINE (VANNE D'INVERSION) (A)   |
| 30        | RAC-22SHX2 006                        | 2                              | DIODE STACK                | JUE DE DIODES                    |
| 50        | RAC-40FNH1 904                        | 1                              | FUSE (25A)                 | FUSIBLE (25A)                    |
| 114       | RAC68N3X2S 010                        | 1                              | COVER (RAW)                | COUVETURE (PLUIE)                |
| 117       | RAC68N3X2S 007                        | 1                              | P.W.B. (SPM2-A)            | CIRCUIT IMPRIME (SPM2-A)         |
| 117       | RAC68N3X2S 008                        | 1                              | P.W.B. (SPM2-B)            | CIRCUIT IMPRIME (SPM2-B)         |
| 202       | RAS-408CX2 023                        | 8                              | BULB SUPPORT               | SUPPORT DE BULBE                 |
| 210       | RAC-68G3X2 012                        | 1                              | PROPELLER FAN              | SOUFFLERIE A HELICE              |
| 211       | ACPC56L2X2 020                        | 1                              | NUT (PROPELLER FAN)        | ECROU (SOUFFLERIE A HELICE)      |
| 212       | RAC-2210MX 005                        | 2                              | O.L.R. COVER               | CAPAT O.L.R.                     |
| 216       | RAC-1807V 002                         | 1                              | HANDLE                     | POIGNEE                          |
| 217       | RAC-2567HV 006                        | 1                              | HANDLE (LEFT)              | POIGNEE                          |
| 219       | RAM-70QH4 901                         | 1                              | BASE                       | BASE                             |
| 225       | RAC-2209LX 007                        | 2                              | NUT FOR O.L.R. COVER       | ECROU (CAPAT O.L.R.)             |
| 226       | RAC68N3X2S 044                        | 1                              | PANEL (BACK)               | PANNEAU (ARRIÈRE)                |
| 227       | RAM-80QH4 903                         | 1                              | PANEL (FRONT)              | PANNEAU (AVENT)                  |
| 228       | RAC-80GW3 005                         | 1                              | CABINET                    | COFFRET                          |

| NO.<br>N° | PARTS NO.<br>N° DE PIÈCE<br>RAM-80QH4 | Q'TY/<br>UNIT<br>QTÉ/<br>UNITÉ | PARTS NAME                       | DÉSIGNATION                                |
|-----------|---------------------------------------|--------------------------------|----------------------------------|--------------------------------------------|
| 229       | RAC68N3X2S 045                        | 1                              | PANEL (SIDE)                     | PANNEAU (CÔTÉ)                             |
| 245       | RAC68N3X2S 042                        | 1                              | FILTER                           | FILTRE                                     |
| 246       | RAC68N3X2S 026                        | 1                              | SOUNDPROOF COVER                 | COUVERTURE INSONORISÉE                     |
| 248       | RAM-70QH4 903                         | 1                              | PARTITION                        | CLOISON                                    |
| 251       | RAC68N3X2S 056                        | 1                              | UPPER PLATE (ELECTRIC BOX)       | PLAQUE SUPÉRIEURE (BOÎTE DE ÉLECTRIQUE)    |
| 252       | RAC68N3X2S 009                        | 1                              | ELECTRIC CASE                    | CAS ÉLECTRIQUE                             |
| 253       | RAM-70QH4 904                         | 1                              | ELECTRIC BOX                     | BOÎTE ÉLECTRIQUE                           |
| 254       | RAM-70QH4 905                         | 1                              | P.W.B. SUPPORT                   | SUPPORT DE CIRCUIT IMPRIME                 |
| 256       | RAM-80HT 904                          | 1                              | TOP LID                          | COUVERCLE SUPÉRIEUR                        |
| 270       | RAC-80GW3 006                         | 1                              | GRILL                            | GRILLE                                     |
| 271       | RAC68N3X2S 047                        | 1                              | SIDE COVER                       | COUVERTURE LATÉRALE                        |
| 303       | RAC-2810HX 008                        | 2                              | SUPPORT (OH-THERMISTOR)          | SUPPORT (OH-THERMISTANCE)                  |
| 409       | RAM-70QH4 912                         | 1                              | CORD (4P) FOR CN2                | CORDE (4P) POUR CN2                        |
| 410       | RAM-80QH4 904                         | 1                              | CORD (4P) FOR CN3                | CORDE (4P) POUR CN3                        |
| 416       | RAC68N3X2S 027                        | 1                              | OVERHEAT THERMISTOR ASSEMBLY (A) | ASSEMBLY (A) DE THERMISTANCE DE SURCHAUFFE |
| 416       | RAC68N3X2S 028                        | 1                              | OVERHEAT THERMISTOR ASSEMBLY (B) | ASSEMBLY (B) DE THERMISTANCE DE SURCHAUFFE |
| 500       | RAC68N3X2S 043                        | 1                              | THERMISTOR (OUT TEMPERATURE)     | THERMISTANCE (EXTERIEURE TEMPÉRATURE)      |
| 501       | HRC-25KX-1 002                        | 6                              | RELAY (FTR-F3)                   | RELAIS (FTR-F3)                            |
| 502       | R-S43MVP 050                          | 1                              | FUSE (2A)                        | FUSIBLE (2A)                               |
| 503       | R-235TX 044                           | 2                              | FUSE HOLDER                      | PORTE-FUSIBLE                              |
| 504       | RAC-206FD 003                         | 1                              | TUBE FUSE (3A)                   | FUSIBLE DE TUBE                            |
| 505       | RAC-25EX 010                          | 2                              | POWER RELAY (G4A)                | RELAIS D'ALIMENTATION (G4A)                |
| 506       | RAC4010KX2 008                        | 4                              | FERITE CORE 935                  | NOYAU EN FERRITE 935                       |
| 507       | RAC68N3X2S 053                        | 1                              | FUSE (5A)                        | FUSIBLE (5A)                               |
| 508       | RAM-103CNH 910                        | 2                              | REGURATOR (MC7805CT)             | REGULATEUR (MC7805CT)                      |
| 509       | RAS-22DWC 006                         | 1                              | TEMPORARY SWITCH                 | INTERRUPTEUR AUXILIAIRE                    |
| 510       | RAS-2216WI 011                        | 2                              | FUSE HOLDER                      | PORTE-FUSIBLES                             |
| 511       | RAS-258EX 043                         | 4                              | COIL (RCH106-82K)                | BOBINE (RCH106-82K)                        |

| NO.<br>N° | PARTS NO.<br>N° DE PIÈCE<br>RAM-80QH4 | Q'TY/<br>UNIT<br>QTÉ/<br>UNITÉ | PARTS NAME                       | DÉSIGNATION                            |
|-----------|---------------------------------------|--------------------------------|----------------------------------|----------------------------------------|
| 512       | RA108CHLXA 908                        | 3                              | VARISTOR (450NR)                 | VARISTOR (450NR)                       |
| 730       | RAC-2210MX 022                        | 1                              | BUSH (BASE)                      | BUSH (BASE)                            |
| 740       | RAC-2810NX 018                        | 1                              | DRAIN PIPE                       | TUYAU DE VIDANGE                       |
| 900       | RAC68N3X2S 801                        | 1                              | COMPRESSOR (A)                   | COMPRESSEUR (A)                        |
| 900       | RAC68N3X2S 802                        | 1                              | COMPRESSOR (B)                   | COMPRESSEUR (B)                        |
| 901       | RAC68N3X2S 803                        | 1                              | CONDENSER                        | CONDENSEUR                             |
| 916       | KPNT1 001                             | 6                              | PUSH NUT                         | ECROU A POUSSER                        |
| 917       | RAC-2226HV 805                        | 6                              | COMPRESSOR RUBBER                | BAGUE CAOUTCHOUEE DE COMPRESSEUR       |
| 920       | RAC68N3X2S 037                        | 1                              | COIL (BLUE, EXPANSION VALVE)     | BOBINE (BLEU, VANNE D'EXPANSION)       |
| 921       | RAC68N3X2S 038                        | 1                              | COIL (YELLOW, EXPANSION VALVE)   | BOBINE (JAUNE, VANNE D'EXPANSION)      |
| 922       | RAC68N3X2S 039                        | 1                              | COIL (RED, EXPANSION VALVE)      | BOBINE (ROUGE, VANNE D'EXPANSION)      |
| 923       | RAC-2810NX 022                        | 1                              | COIL (ELECTRIC, EXPANSION VALVE) | BOBINE (ELECTRIQUE, VANNE D'EXPANSION) |
| 925       | RAC68N3X2S 034                        | 1                              | THERMISTOR PIPE                  | THERMISTANCE TUBE                      |
| 925       | RAC80N4X2S 003                        | 1                              | THERMISTOR PIPE                  | THERMISTANCE TUBE                      |
| 990       | RAM-70QH4 902                         | 1                              | VALVE ASSEMBLY                   | VANNE                                  |
| 991       | ATI-0972B 936                         | 5                              | TERMINAL BORD (2P)               | BORNIER DE RACCORDEMENT (2P)           |

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